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ENVIRONMENTAL STATEMENT

RABON CREEK WATERSHED PROJECT

GREENVILLE AND LAURENS COUNTIES

SOUTH CAROLINA



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON, D. C. 20250

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Rabon Creek Watershed Project
Greenville and Laurens Counties, South Carolina

FINAL ENVIRONMENTAL STATEMENT

George E. Huey, State Conservationist
Soil Conservation Service

Sponsoring Local Organizations

Laurens Soil and Water Conservation District
Route 3
Clinton, South Carolina 29325

Greenville County Soil and Water Conservation District
Route 4
Piedmont, South Carolina 29673

Rabon Creek Watershed Conservation District
Route 4
Laurens, South Carolina 29360

Laurens County Water Resources Commission
Route 4
Laurens, South Carolina 29360

November 1974

Prepared by

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
901 Sumter Street
Columbia, South Carolina 29201

USDA ENVIRONMENTAL STATEMENT

Rabon Creek Watershed Project

Greenville and Laurens Counties
South Carolina

Prepared in accordance with
Sec. 102(2)(C) of P.L. 91-190

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of project, purpose and action

The Rabon Creek Watershed covers an area of 73,000 acres in Laurens County and 12,500 acres in Greenville County, South Carolina. The watershed will be installed by sponsoring organizations with federal assistance under PL 83-566, as amended.

The watershed measures include: (1) land treatment for the reduction of sediment and control of erosion; (2) two floodwater retarding structures for flood prevention; (3) one multiple purpose structure for flood prevention, recreation, and water supply storage; and (4) a recreation development with two areas.

- V. Summary of environmental impact and adverse environmental effects

Floodwater damages will be reduced on 3,020 acres by approximately 76 percent. Overbank sediment deposition damages will be reduced by 65 percent. Sediment deposition into Lake Greenwood will be reduced by 76 percent. At least 85 family farms will directly benefit from the reduction of flooding. Runoff water and erosion from the uplands will be reduced.

The water supply, 20 million gallons per day (mg/d), will provide a dependable source of water for a projected population of 76,000 by the year 2000. The pools will enhance the value of an estimated 120 homesites.

An estimated 49,000 visitor days annually of recreational opportunity will be created, and 693 surface acres of lake fishery will be created.

About 110 permanent jobs will be created as a result of the project. In addition, about 50 man-years of employment will be provided during the installation period.

Approximately 744 acres of land will be used for dams, spillways, sediment pools, permanent pools, and borrow areas; and 811 acres will be temporarily flooded when storm runoff is stored. An additional 361 acres will be designated for recreation use.

Ten and two-tenths miles of streams will be inundated by permanent pools. Air quality will be adversely affected for a short period from disposal of vegetation from land clearing. Traffic will be increased which will increase road maintenance, especially around the new recreation areas.

VI. List of alternatives considered

- A. Accelerated land treatment
- B. Land treatment, Site 32, and channel enlargement above Site 32
- C. Land treatment, channel work, municipal and industrial water supply from Lake Greenwood, and stream side recreation
- D. Land treatment, flood proofing, land use compatible with present flooding, and municipal and industrial water from Lake Greenwood
- E. No project

VII. Comments have been received from the following agencies:

- A. Department of the Army
- B. Department of Health, Education and Welfare
- C. Department of the Interior
- D. Department of Transportation
- E. Environmental Protection Agency
- F. South Carolina Division of Administration (State Clearinghouse)
- G. Advisory Council on Historic Preservation
- H. South Carolina Water Resources Commission
- I. Upper Savannah Regional Planning and Development Council

VIII. Draft Statement Transmitted to CEO on June 14, 1974

ADDENDUM

RABON CREEK WATERSHED, SOUTH CAROLINA

May 1975

The purpose of this addendum is to modify the planned principal spillway in Site 32 of the Rabon Creek Watershed to include an orifice in the riser.

The U. S. Department of Interior has expressed concern as to the effects of the proposed impoundment on downstream aquatic life in Rabon Creek and requested that the 7-day 10-year low flow be released continuously through the structure. To accomplish this an orifice will be designed in the riser of the principal spillway. The U. S. Geological Survey has estimated the 7-day 10-year low flow at the site to be about nine cubic feet per second.

Special drought measurements were made on Rabon Creek at a point just above the proposed site in 1954 during the most critical drought on record. The drainage area at the gaging station is 89 square miles. The minimum flow recorded was 4.23 c.f.s. and occurred on October 7, 1954.

The estimated cost of installing the structure will not be affected by the addition of the orifice.



USDA SOIL CONSERVATION SERVICE

FINAL ENVIRONMENTAL STATEMENT

for

Rabon Creek Watershed

Greenville and Laurens Counties, South Carolina

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Laurens Soil and Water Conservation District
Greenville County Soil and Water Conservation District
Rabon Creek Watershed Conservation District
Laurens County Water Resources Commission

PROJECT OBJECTIVES AND PURPOSES

The objectives of the watershed project are to improve the economic and environmental conditions of the community through water and related land resource conservation and development. More specific objectives developed during planning by the Sponsoring Local Organizations and agreed to by the Service are as follows: (1) To provide watershed protection that will reduce erosion and bring soil loss to within tolerable limits; (2) To provide flood protection to the degree that most of the flood plain land can be used for improved pasture; (3) To reduce sediment to Lake Greenwood; (4) To provide additional non-contact water-based recreational opportunities such as fishing, picnicking, boating, sight-seeing, and nature studies with a maximum daily use of 500 people; and (5) To provide a dependable source of water to meet present and future needs for a population of 76,000 people by the year 2000.

PLANNED PROJECT 1/

Land Treatment Measures

Conservation treatment systems will be installed on 2,400 acres of cropland scattered throughout the watershed during the project installation period reducing soil loss to within tolerable limits. At least two systems of treatment will be used. These systems are as follows:

System 1: A combination of terraces, grassed waterways, field borders, land leveling, stripcropping, contour farming, and conservation cropping systems.

System 2: A combination of grassed waterways, field borders, land leveling, contour farming, conservation cropping systems, and no-till planting.

All of the practices in System 1 and System 2 can be used together and with excellent results for conservation farming, but the land's capabilities will govern what practices should be employed and in what combination. The practices used in the two systems are defined in the following:

Grassed waterway: A natural or constructed waterway or outlet shaped and established in suitable vegetation as needed for the safe disposal of runoff from a field, diversion, terrace, or other structure.

Terraces: A ridge or channel constructed across the slope at a suitable spacing and with an acceptable grade.

Field borders: A border of perennial vegetation established at the edge of a field by planting or by converting it from trees to herbaceous vegetation or shrubs.

Contour farming: The planting of row crops horizontally across the slope of the land so as to reduce runoff and soil erosion.

Stripcropping: Growing crops in a systematic arrangement of strips or bands to reduce water erosion.

Conservation cropping systems (crop rotation): The growing of different crops in a regular succession usually alternating row crops with erosion resistant cover crops.

1/ All information and data, except as otherwise noted by reference to source, were collected during watershed planning investigation by the Soil Conservation Service and Forest Service, U.S. Department of Agriculture.

No-till planting: The planting of crops with no prior tilling or any post planting cultivation.

Land smoothing: Removing irregularities on the land surface by use of special equipment.

Other areas will receive partial treatment. Critically eroding cropland will receive special treatment during the installation period by the establishment of permanent grasses.

On pastureland, the major treatment system will include smoothing the land and pulling down and smoothing old terraces by special equipment, removal of undesirable forage and weeds by mechanical cutting and applying selected herbicides, planting improved grasses and legumes, and a complete fertilization and liming program based on soil tests and treatment needs. Cross fencing will be installed where deemed necessary. During the installation period, an estimated 3,300 acres of pastureland will be adequately treated and additional areas will receive partial treatment.

On forest land, conservation practices will be installed that will improve hydrologic conditions. By manipulating stand compositions that create favorable conditions for the maximum production and protection of litter and humus, a protective cover and an absorbent forest floor will develop. These practices will reduce runoff and erosion and will, therefore, reduce damages to the flood plains below.

Measures that create these favorable conditions include tree planting, timber stand improvement, thinnings, and protection of the forest floor from livestock grazing and wild fires.

To provide for proper installation and maintenance of these measures, forest management plans will be prepared and included as a part of conservation plans for 125 landowners, covering 8,000 acres.

Forest measures to be installed during the installation period include 1,000 acres of tree planting, 11,900 acres of hydrologic stand improvement, and the stabilization of 90 acres of critically eroding forest land.

Treatment to be installed on land in other uses includes erosion control practices of mulching and establishing grasses, planting of trees, and planting of grasses and shrubs which will also provide wildlife food and cover on about 500 acres including such areas as construction sites, school grounds, roads, and borrow areas. In addition, special treatment such as sloping roadbanks, mulching, and establishing grasses will be provided to stabilize 15 acres of critically eroding county roads.

Included in the plan are practices for the improvement of fish and wildlife habitat and recreational areas. Wildlife habitat improvement will consist of food and cover plantings and management on approximately 300 acres of land that were formerly borrow areas, idle land, and field edges. Fish habitat improvement will include the development of lake fishery resources. Recreational areas will receive practices of establishing grasses, planting of selected trees and shrubs, and trimming and thinning of existing stands of trees and shrubs for recreational

and aesthetic improvement.

The planned land treatment in the watershed will also change the present land use for optimum conservation of the resources. During the installation period, approximately 300 acres will be taken out of cultivation and established in pasture; 1,000 acres of idle land will be used to suit its capability in either cropland, pastureland, trees, or wildlife habitat.

Structural Measures

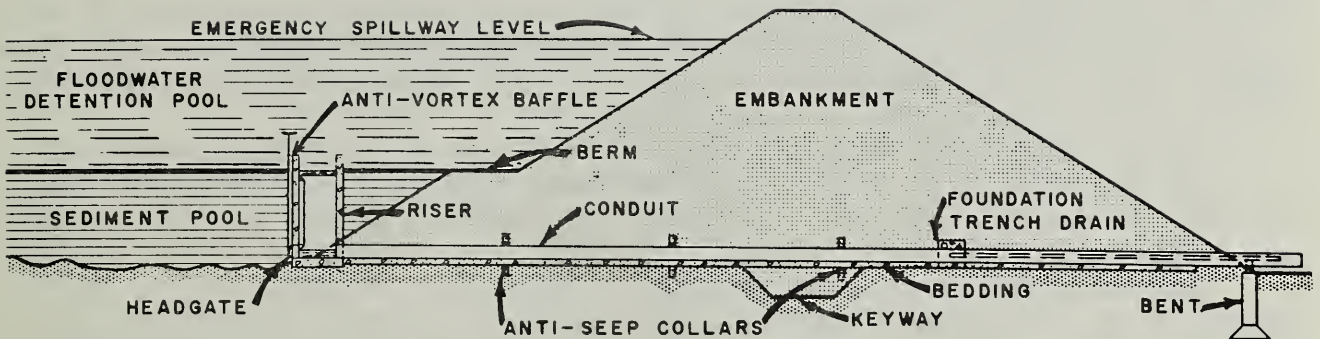
Structural measures to be installed consist of two single purpose structures for flood prevention (Sites 20 and 21) and one multiple purpose structure for flood prevention, water supply and recreation (Site 32). Two public access areas with recreation facilities are planned in conjunction with Site 32. The locations of structural measures are shown on the Project Map.

The total drainage area above structures is 59,514 acres, or about 70 percent of the watershed area. This includes 10,765 acres above Structure 20 and 8,781 acres above Structure 21.

All three structures will consist of earthfill embankments and reinforced concrete principal spillways located on yielding foundations. Structures will range from 45 to 57 feet in height and from 800 to 1,400 feet in length.

Principal spillways will consist of reinforced concrete risers on the upstream side of the structure with reinforced concrete pipes fitted with anti-seep collars placed through the embankments. The principal spillways of the single purpose structures, Structures 20 and 21, will outlet into excavated plunge basins. The plunge basins will be deep basins excavated at the end of the principal spillway pipes. Water flowing through the principal spillway plunges down into the pool dissipating much of its erosive energy. (See typical section of single purpose structure

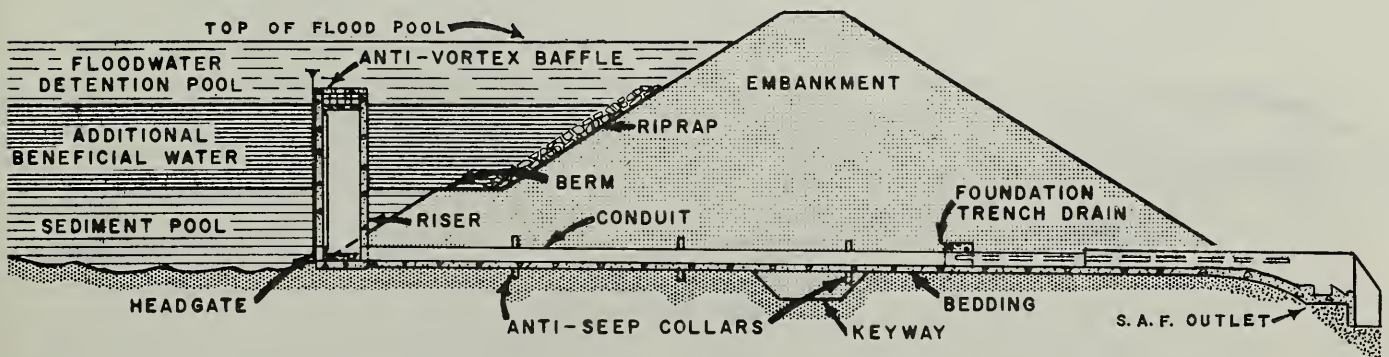
below.)



SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE

(WITH SINGLE STAGE RISER)

The principal spillway of the multiple purpose structure, Structure 32, will outlet into a Saint Anthony Falls (SAF) type, energy dissipating basin. This basin creates a hydraulic jump, a turbulent, rapid rise in the water surface, which dissipates much of the water's erosive energy within the reinforced concrete structure. (See typical section of a multiple purpose structure below.)



SECTION OF A TYPICAL MULTIPLE PURPOSE STRUCTURE

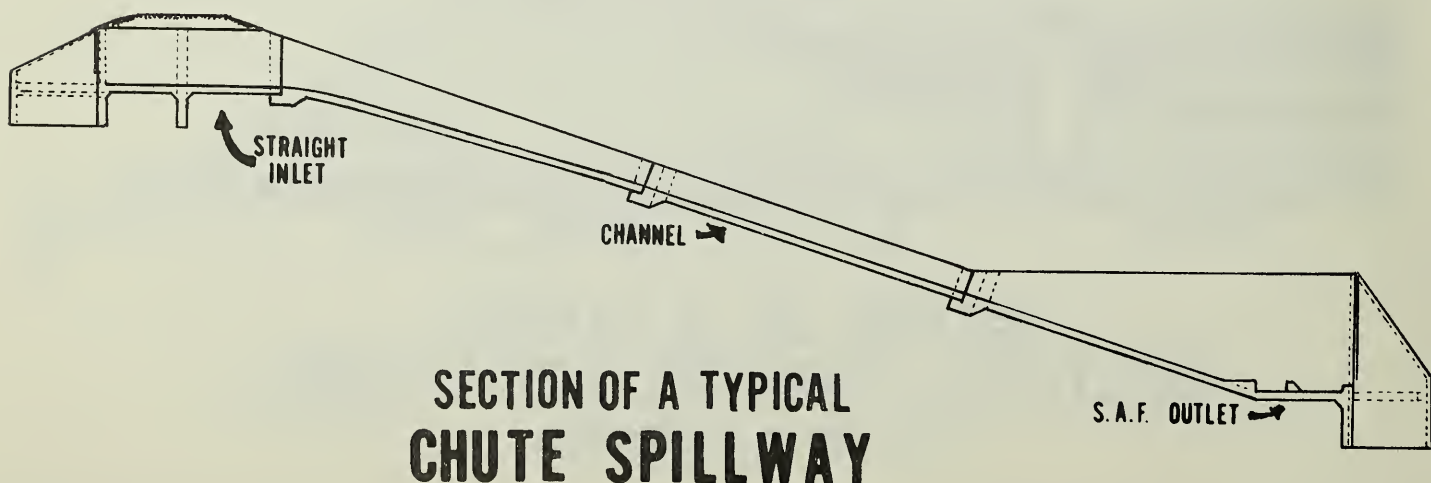
(WITH SINGLE STAGE RISER)

All structures are designed for an effective life of 100 years. The crest of the principal spillways of Structures 20 and 21 will be set at the 100 year sediment accumulation elevation. The crest of the principal spillway for Structure 32 will be set at an elevation to store the accumulated sediment over a 100 year period, 2,426 acre feet of municipal and industrial water, and 2,674 acre feet of recreation water.

The emergency spillways for Structures 20 and 21 will be constructed in earth and vegetated. Elevations for these spillways will be set at the 100 year frequency level and will have a one percent chance of operation in any year.

The low point of a saddle adjacent to the right abutment of Structure 21 is 3.5 feet lower than the emergency spillway elevation. A dike, approximately 430 feet in length, will be located in the saddle with its top elevation equal to that of the top of the dam.

Structure 32 will have a 150 foot wide reinforced concrete chute spillway on a yielding foundation at an elevation 7.5 feet above the principal spillway. This chute spillway will function as the second stage of the principal spillway and as the emergency spillway. All discharge from Site 32 will pass through the principal spillway or the chute spillway. The storage between the crest of the principal spillway and the crest of the chute spillway is the 40 percent chance runoff from its uncontrolled drainage area. Retarding storage in the reservoir reduces the two year frequency-24 hour duration storm peak discharge from the structure from 3,100 cubic feet per second (cfs) to approximately 800 cfs. It also reduces the 100 year frequency principal spillway design storm peak outflow from 14,600 cfs without the project to 7,720 cfs with the project structural measures. (See typical section of a chute spillway below.)



The embankment of Structure 32 will be constructed across the Rabon Creek valley and across a saddle adjacent to the right valley abutment. (See aerial photographic mosaic on the following page.) The principal spillway will be located in the saddle near the right end, looking downstream, of the centerline of the dam. The chute spillway will be located through the ridge which is the dam's left abutment. The upstream face of the embankment will be riprapped in the area subject to drawdown and wave action. A dike, approximately 300 feet long and four feet high will be constructed in a saddle southwest of the right end of the dam with its top elevation equal to the top of dam elevation.

Borrow material for construction of the structures will be obtained from the excavated spillways and other borrow areas near the proposed structures. Some of the borrow needed for Structures 20 and 21 and most of the borrow needed for Structure 32 is located above the top of dam elevation.

The sediment pools of Sites 20 and 21 will initially fill with water but will gradually be replaced with sediment during the 100 year life of the reservoirs. The sediment pools of Sites 20 and 21 and the normal pool of Site 32 plus a strip 15 feet horizontally from the water's edge will be cleared of woody vegetation as will construction areas for structure embankments, emergency spillways, the chute spillway, and borrow areas. The total area to be cleared is 827 acres, consisting of 776 acres in and adjacent to structure sediment and normal pool areas and 51 acres in construction areas for structure embankments, spillways, and borrow areas. No other land use changes will occur within the area.

Vegetation suitable to the soils, site conditions, and intended uses will be established on the embankments, exposed borrow areas, and on all disturbed areas associated with the chute spillway. On emergency spillway areas of Structures 20 and 21 and in the entrance channel leading to the chute spillway, the vegetation to be used will be bermuda grass. Grasses and/or legumes will be established on the embankments. Varieties of vegetation favorable to wildlife will be established in the exposed borrow areas. The cleared strip along the edge of the pools will revegetate itself in native vegetation.

Easements will be obtained to the top of dam elevation at Sites 20 and 21 and will include 715 acres. The Sponsoring Local Organizations will purchase about 1,154 acres at Site 32. This area includes 540 acres for the normal pool and 614 acres for the dam and spillway, borrow areas, a portion of the flood pool, and areas designated for recreation. Pool areas, up to the top of dam elevation, more than 200 feet upstream from the head of the normal pool in each arm of the reservoir (426 acres) were excluded from the area to be purchased and will be obtained by easements.

The 540 acre municipal and industrial water supply pool will be grubbed to improve initial water quality. Municipal water intake gates will be installed on the principal spillway riser to release water for pick-up approximately 2,000 feet downstream at the existing pumping

station owned by the Public Works Commission of the city of Laurens.

Raw water will initially be pumped approximately seven miles to the existing water treatment plant owned by the Commission. Water will be sold by the Laurens County Water Resources Commission to the Public Works Commission of the cities of Laurens and Clinton, the Rabon Creek Water District, and other water districts for resale and distribution to the people of the county.

When future water needs grow to exceed the capacity of the existing treatment plant, the Laurens County Water Resources Commission is planning to construct a pumping platform adjacent to the reservoir with a water treatment plant nearby. The pumping platform and water treatment plant will not be needed for a number of years, and were therefore, not included as a part of this project.

One of the two recreational areas planned in conjunction with Site 32 will be located on North Rabon Creek and the other on South Rabon Creek. (See Project Map.) The North Rabon Creek area will be located approximately one and three-quarters miles upstream from Structure 32 and will be accessible by paved road from State Highway 76 and by dirt road from State Highway 252. The South Rabon Creek area will be located just downstream from the State Secondary Highway 312 bridge. The recreational areas will contain recreational facilities and will provide full public access to the reservoir and to the access strip around the reservoir. Facilities are shown on the Public Recreational Development Area Map and the Recreational Area Maps.

The recreational areas will contain paved access roads, parking areas for cars and boat trailers, boat ramps, picnic tables, cast iron grills, underground waste receptacle units, picnic shelters, foot trails, and comfort stations.

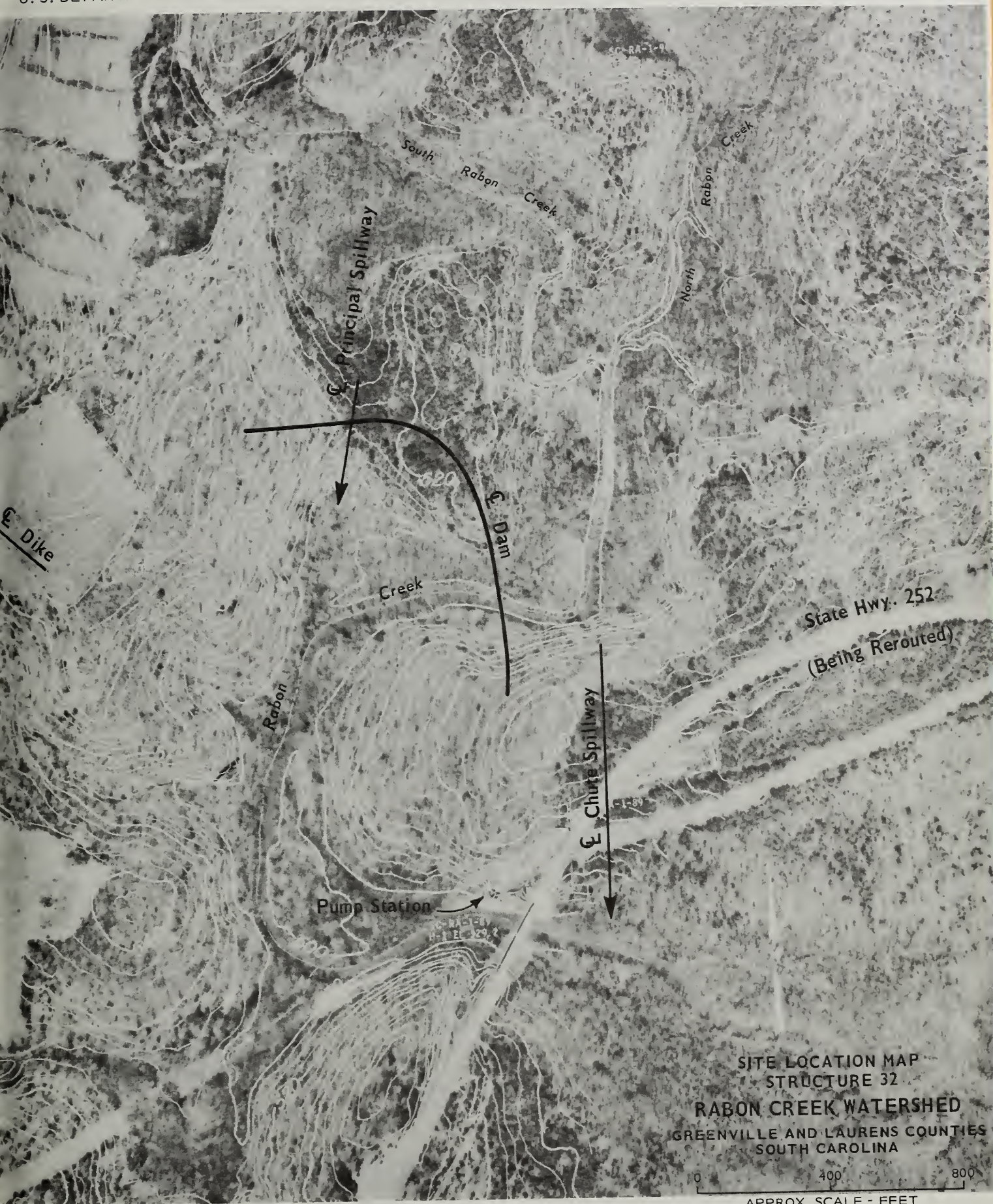
Paved roads and parking areas will consist of one and one-half inches of asphaltic surface over a six inch crushed stone base. The width of the paved surface will be 22 feet. All roads and parking areas will generally follow the contour. Grasses and/or legumes will be established on all cuts and fills. Drainage will be provided by collection ditches and culverts where necessary. A 45 foot precast reinforced concrete bridge will be needed at the North Rabon Creek recreational area.

The boat launching ramps will be constructed of 12 foot wide reinforced concrete logs. The double launching ramp will contain a combination divider strip and walkway made of reinforced concrete. The single ramp installation will include the divider strip as a walkway.

Picnic tables will be constructed with reinforced concrete uprights and wooden seats and table tops. Wooden picnic shelters will be approximately 20'x40' with a concrete floor.

A four unit (2+2) and a two unit (1+1) flush type comfort station will be located at each recreational access area. Septic tanks with disposal fields will be used to treat wastes. Soils are suitable for septic tanks. All sanitary facilities will be approved by appropriate federal, state, and local health authorities prior to installation.

Wells will be drilled at each recreational area to provide water for



SITE LOCATION MAP
STRUCTURE 32
RABON CREEK WATERSHED
GREENVILLE AND LAURENS COUNTIES
SOUTH CAROLINA

0 400 800
APPROX. SCALE - FEET

SCALE 1" = 400'
CONTOUR INTERVAL = 5'

MARCH 1974 4-R-33825

the comfort stations and hydrants. One pump is planned for each area. Hydrants will be located adjacent to parking areas and boat launching ramps.

Foot trails will be constructed five feet wide and will be graded to provide a good hiking surface.

Electrical distribution lines will be installed to provide power for operating the water pumps and lighting for the comfort stations and parking areas.

Signs for identification and directions will be installed. Gates will be installed to control access. The areas will be landscaped as needed.

All planned structural measures will meet the requirements of local and state health laws.

The facilities will be designed and constructed to assure accessibility and usability by physically handicapped people in accordance with Public Law 90-480.

Land areas to be committed to structural measures are summarized as follows:

	Forest land	Pastureland	Total
	----- (acres) <u>1</u> / -----		
<u>Site 20</u>			
Sediment Pool	93	0	93
Flood Pool	290	25	315
Dam & Emergency Spillway	4	1	5
Borrow Areas	4	4	8
<u>Site 21</u>			
Sediment Pool	60	0	60
Flood Pool	166	29	195
Dam & Emergency Spillway	5	1	6
Borrow Areas	5	0	5
<u>Site 32</u>			
Sediment Pool	218	0	218
Recreation Pool	402	0	402
M&I Pool	537	3	540
Flood Pool	947	47	994
Dam & Chute Spillway	16	0	16
Borrow Areas	11	0	11
Recreation 2/	1,087	67	1,154

1/ Pool areas are cumulative.

2/ Includes recreation areas, normal pool, dam and spillway, borrow areas, and part of the flood pool.

During construction, the following actions will be taken to control erosion and pollution:

- a. Sprinkling will be used to keep dust in construction areas within acceptable limits.
- b. Sanitary facilities will be installed according to the requirements of the South Carolina Department of Health and Environmental Control.
- c. Measures will be provided at equipment and repair areas to prevent contaminants from reaching streams and ground water.
- d. All operations will be conducted to minimize stream turbidity at and below the structures. Requirements established by the South Carolina Department of Health and Environmental Control will be conformed to during construction. The following erosion and sediment control measures will be applied as needed to the area of land which will be exposed:
 - (1) the contract will include earthmoving equipment time to construct diversions, waterways, and terraces as needed to retard the rate of runoff and control runoff from the construction site;
 - (2) debris basins will be used to minimize sediment leaving the construction site where needed;
 - (3) clearing and grubbing of construction sites and borrow areas will occur in stages as construction progresses;
 - (4) temporary vegetation and/or mulching will be used to protect the soils; segments of work will be completed and protected as rapidly as is consistent with construction schedules; and
 - (5) conduits or bridges will be installed where construction activities cross flowing streams.
- e. Prior to construction, areas will be designated for the disposal of waste material. All debris will be disposed of in accordance with regulations of the South Carolina Department of Health and Environmental Control. The landowners of the area to be cleared will be given the opportunity to salvage trees prior to the beginning of construction.

- f. Vector control will be mutually agreed upon by the Soil Conservation Service, local sponsors, and the South Carolina Department of Health and Environmental Control.

Included in changes to fixed improvements needed to install the project measures, is the raising and lengthening of the bridge over South Rabon Creek on State Secondary Highway 312 located within the flood pool of Site 32. The bridge will be raised five feet to elevation 544.5 and will be lengthened by 30 feet. The 16 inch raw water line from the pump station passes through the area where the chute spillway will be located. It will be relocated and will cross through the entrance channel leading to the chute spillway.

Two bridges over South Rabon Creek and within the flood pool of Site 20 will be raised and lengthened. The bridge on State Secondary Highway 451 will be raised four feet to elevation 719.5 and will be lengthened 15 feet. The bridge over the first county road upstream from Structure 20 will be raised 12 feet to elevation 719.5 and lengthened 30 feet. A co-op power pole located in the flood plain of South Rabon Creek upstream from the latter described bridge will be moved to a higher elevation. The top of dam elevation of a farm pond located near this same bridge is approximately the same elevation as the crest of the emergency spillway of the structure. Since the emergency spillway of the structure is set at the 100-year flood frequency level, no changes to the farm pond are planned.

The 70 foot steel truss bridge over North Rabon Creek on State Secondary Highway 259, within the flood pool of Site 21, is 3.8 feet lower than the emergency spillway level. Instead of raising the old bridge, a new 150 foot reinforced concrete bridge will be installed at elevation 689.0, 5.3 feet higher than the old bridge. Another bridge, (wooden) located at the next crossing upstream from the steel bridge is also lower than the emergency spillway level. It will not be replaced since it is 18.5 feet above the normal pool level and will not be frequently inundated. Adequate access is available to the area by other roads. Two, old, abandoned houses and an old barn are below the top of dam elevation in Site 21. One house and the barn are used for storing hay, but are above the maximum water surface elevation during the passage of the emergency spillway storm and will not be moved. The other abandoned house is near the emergency spillway elevation, has little value and will not be moved. The old Owings Family Cemetery is located downstream from the centerline of Structure 21 on the right abutment. This area will not be disturbed during construction. One telephone pole near the old steel bridge on State Secondary Highway 259 will be raised.

The project will comply with the Historic and Archeological Data Preservation Act, Public Law 86-523 and the Historic Properties Preservation Program, Public Law 89-665 (Section 106). The watershed work plan has been coordinated with the Institute of Archeology and Anthropology, University of South Carolina. Field investigations by the

Institute indicate that the project will not encroach on any archeological values. One building in the watershed is listed in the National Register of Historic Places, but it is not affected by the project. If artifacts or other items of archeological or historical significance are uncovered during construction, the Institute of Archeology and Anthropology and the National Park Service will be notified.

Operation and Maintenance

The Laurens and Greenville County Soil and Water Conservation Districts will be responsible for maintenance of the sites where critical area treatment practices will be applied. Landowners and operators will maintain land treatment measures located on their land through cooperative agreements with the soil and water conservation districts. The Service and the State Commission of Forestry will provide technical assistance for maintenance.

Structures 20 and 21 will be operated and maintained by the Rabon Creek Watershed Conservation District through funds obtained from a tax levy on real property in the watershed. The estimated annual operation and maintenance cost of these structures is \$600.

Structure 32 will be operated and maintained by the Rabon Creek Watershed Conservation District. Maintenance of this structure, estimated to be \$1,000 annually, will be financed through the sale of water.

Maintenance of structures will include, but is not limited to, mowing, fertilizing and controlling the vegetation; repair of any damage to the principal spillways, emergency spillways, the chute spillway, and embankments; and removal of any floating logs and debris which may affect the operation of the structures.

The Rabon Creek Watershed Conservation District will operate and maintain the recreational development associated with Site 32. A full-time employee will be hired to operate and maintain recreational facilities. During peak use periods additional help will be procured. The recreational areas will require repair and replacement of facilities, mowing of grassed areas, and other normal upkeep. Annual operation and maintenance of facilities is estimated to be \$14,700. Funds to defray these costs will come from an annual appropriation by Laurens County and from user fees.

The 693 surface acres of water impounded by the three structures will be stocked with game fish and managed according to recommendations by the South Carolina Wildlife and Marine Resources Department.

Specific maintenance agreements between the Service and the sponsors will be executed prior to issuing bid invitations for construction of each measure. The operation and maintenance of structural measures will be performed as indicated in the South Carolina Watershed Operations and Maintenance Handbook, prepared by the Soil Conservation Service.

The South Carolina Department of Health and Environmental Control will monitor water quality at Site 32 to make sure that the state water quality standards are met.

During periods of low stream flow, water will be released through gates installed on the principal spillway risers for reservoir management.

Release rates will at least equal inflow to the reservoir. The Rabon Creek Watershed Conservation District will be responsible for releasing water as needed.

For three years following installation of the structural measures, the Service and the sponsors will make joint inspections annually, after unusually severe floods, or after the occurrence of any other unusual event that might affect the structural measures. Inspection after the third year will be made by the sponsors. One copy of their annual report will be sent to the Service representative and one copy filed by the sponsors and made available for authorized inspection.

Project Costs

Cost estimates are as follows:

	<u>PL-566</u>	<u>Other</u>	<u>Total</u>
Land Treatment	\$ 189,600	\$ 564,700	\$ 754,300
Structural Measures			
Construction	1,496,400	454,300	1,950,700
Engineering	87,000	15,300	102,300
Administration	70,200	11,200	81,400
Land Rights	180,400	412,000	592,400
Total Structural Measures	1,834,000	892,800	2,726,800
TOTAL PROJECT	\$2,023,600	\$1,457,500	\$3,481,100

ENVIRONMENTAL SETTING

Physical Resources

The Rabon Creek Watershed consists of 85,500 acres in the upper Piedmont region of South Carolina. About 85 percent or 73,000 acres are in Laurens County and the remaining 12,500 acres are in Greenville County. The watershed's 25 mile length extends from Fountain Inn, near the northwestern corner, to Rabon Creek's confluence with the Saluda River and Lake Greenwood. It is bordered by the headwaters of Durbin, Beaverdam, and Warrior Creeks on the north; Little River on the east; and Reedy River on the west. The towns of Gray Court, Fountain Inn, and Hickory Tavern are located along the rim of the watershed. The city of Greenville is 20 miles north and the city of Laurens is one-quarter mile east of the watershed. The population of the watershed is about 4,000. All of the families are classed as rural, but more than half are rural non-farm.

Rabon Creek is a tributary of the Saluda River within the Santee River Basin. It is in the South Atlantic-Gulf Region and the Santee-

Edisto subregion designated by the U.S. Water Resources Council^{1/}. This is the traditional cotton region and consists of gently sloping to rolling Southern Piedmont. The average annual precipitation ranges from 45 to 55 inches. The average annual temperature is 61 degrees Fahrenheit. The freeze-free season averages 240 days for the region as a whole, but it ranges from 220 to 290 days over the years^{2/}.

Soils with loamy surface layers and red or dark red subsoils are dominant throughout the region. A limited acreage of soils has a compacted or slightly cemented layer at 18 to 35 inches below the surface. This layer has slow permeability and restricts plant root development. Soils on the flood plains commonly are loamy. Many have free water at 18 to 40 inches below the soil surface for at least 60 days a year. These soils, with proper management, are some of the best suited for agriculture within the region.

The principal soil series in the watershed and the dominant characteristics of each are as follows^{3/}:

<u>Soil Series</u>	<u>Slope Range</u> (percent)	<u>Permeability</u>	<u>Depth</u>
Appling	2-10	Moderate	Deep
Cartecay-Toccoa ^{4/}	0- 2	Mod. Rapid	Deep
Cataula ^{5/}	2-10	Slow	Deep
Cecil	2-15	Moderate	Deep
Enon ^{6/}	2-15	Slow	Mod. Deep
Hiwassee	2-15	Moderate	Deep
Madison	2-40	Moderate	Deep
Pacolet	10-40	Moderate	Mod. Deep
Wilkes	6-40	Mod. Slow	Shallow

^{1/} Water Resources Regions and Subregions for the National Assessment of Water and Related Land Resources, July 1970, Water Resources Council, Washington, D.C.

^{2/} Atlas of River Basins of the United States, prepared by U.S. Department of Agriculture, Soil Conservation Service, June 1963.

^{3/} Soils Survey Laurens and Union Counties, South Carolina (now being printed), USDA, Soil Conservation Service.

^{4/} Flood plain soils. Cartecay is moderately well to somewhat poorly drained. All other soils are well drained.

^{5/} Has fragipan.

^{6/} Has high shrink-swell characteristic.

Classification of watershed soils by capability class and subclass is shown below^{1/}:

<u>Capability Class and Subclass</u>	<u>Percentage of Watershed Area</u>	<u>Number of Acres</u>
IIe	48.5	41,467
IIIe	22.5	20,466
IVe	14.7	12,568
VIe	3.1	4,874
VIIe	2.7	2,309
IIIw	8.5	6,400

The 6,400 acres of flood plain soils along Rabon Creek and its tributaries are classified IIIw land. The major problems on this land are floodwater and sediment damages to pasture and roads. Flooding has caused some cropland to be moved to the upland.

The land capability classification system is the grouping of soils to show, in a general way, their suitability for most kinds of field crops, pasture, and wildlife. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The letter "e" indicates that erosion is the primary hazard and "w" designates a wetness hazard. Capability Classes II and III include those soils suitable for annual or periodic cultivation of row crops. Capability Class IV includes those soils on which cultivation should be undertaken only occasionally or under very careful management. Capability Classes VI and VII include those soils considered unsuitable for cultivation of row crops, but can be used for pasture, forest, or wildlife plantings.

The bedrock within the watershed consists of schist, granite, and gneiss. Belts of these materials traverse the watershed in an east-west direction. They are named from north to south - The Inner Piedmont Belt, The Kings Mountain Belt, and The Charlotte Belt. The ages for most of these rock units are subject to many varied geologic interpretations. Overstreet and Bell^{2/} assign their ages as: Schist, Upper Precambrian to Mississippian Ages, Granite, Ordovician to Permian Ages; and Gneiss, Precambrian to Devonian Ages.

There are possible commercial deposits of vermiculite and granite in the watershed, but none are being mined at present. Crushed granite and deposits of vermiculite are being mined in upland areas east of the watershed near Laurens^{3/}.

^{1/} USDA, op. cit.

^{2/} Overstreet, W.C., and Bell, H., III, The Crystalline Rocks of South Carolina, Geological Survey Bulletin 1183, 1965.

^{3/} South Carolina Mineral Producers Directory, South Carolina State Development Board, Circular 2, 1972.

Ground water is the main source of supply for rural residents. Weathered areas in the granites and schists are the aquifers for most watershed wells. Maximum consumption data from sampled watershed wells, their chemical analyses, and State Drinking Water Standards are shown in Appendices G and K.

The watershed is within the northwest climatic division of the state. The topography is highly dissected with elevations ranging from 850 ft. msl., near Fountain Inn to 430 ft. msl., at Lake Greenwood. The average annual precipitation is 49 inches with 25 percent occurring in the spring, 26 percent in the summer, 21 percent in the fall, and 28 percent in the winter. Rainfall during the growing season is unevenly distributed and crops often suffer from lack of moisture. Most winters bring light snowfalls of two to six inches that stay on the ground for only a day or two. The average annual temperature is 62° F. The extreme recorded temperature ranges are 0° F and 107° F^{1/}. Growing seasons are long enough for crops such as cotton, soybeans, and corn to reach maturity. Winters are mild enough for fall planted small grain production. Cattle can endure the winter weather without shelter, but require some supplementary feeding of hay and grain during the coldest winter days.

Rabon Creek heads in Greenville County near Hopewell Church, Hillcrest School, and Fountain Inn. The upper portion is made up of two major tributaries. North Rabon Creek, beginning as Stoddard Creek, runs in a southward direction as it is joined by Mountain Creek, Lick Creek and numerous smaller streams to its confluence with South Rabon Creek near State Highway 252. South Rabon Creek heads in Greenville County and is joined by Payne Branch near the county line. It then flows south, picking up small branches, and joins North Rabon Creek. These streams form Rabon Creek which continues its southward flow to Lake Greenwood, which has a surface area of 11,400 acres. The streams named above are perennial. Field and map surveys indicate that there are 200 miles of perennial streams within the watershed. Characteristics at selected points along the perennial streams are shown in Appendix H.

Perennial streams are supported by approximately 350 miles of intermittent streams. The intermittent streams generally flow during wet weather, but become dry during late summer and early fall. A field survey of selected areas within the watershed, indicates that a drainage area of approximately 300 acres with three to five miles of ephemeral drainageways is needed to originate an intermittent stream.

Rabon Creek is classified by the South Carolina Department of Health and Environmental Control as a Class "B" stream^{2/}. This classification

1/ The Climate of South Carolina, Climatic Series No. 1, Department of Agronomy and Soils, South Carolina Agricultural Experiment Station, Clemson Agricultural College, July 1958.

2/ Stream Classifications for the State of South Carolina, South Carolina Department of Health and Environmental Control, 1972.

is assigned to a stream after a public hearing as being the stream quality desired. The actual stream quality may be better or worse than the classification assigned. The current state policy is to improve all stream quality. After a classification is selected, then it becomes law that nothing can be done to lower the water quality below the assigned value. A Class "B" stream has the standard of being suitable for municipal and recreational purposes, excluding swimming. (See Appendix J.) The city of Laurens is presently obtaining raw water from Reedy Fork of Little River and from Rabon Creek. For raw surface water quality at selected points in the watershed, see Appendix I.

There are an estimated 60 farm ponds within the watershed. The average size of these ponds is five to six acres. These ponds usually hold water throughout the year and furnish water for livestock, fishing, and limited irrigation. There are no lakes of significance within the watershed.

Plant and Animal Resources

The 48,600 acres of upland forest are made up of the following types: pine, 65 percent; pine-hardwoods, 13 percent; hardwood-pine, 6 percent; and hardwood, 16 percent. The principal species of the upland are shortleaf pine, Virginia pine, red cedar, red oak, white oak, yellow poplar, sycamore, sweetgum, hickory and dogwood. Forests in the flood plain constitute 4,400 acres and are mostly hardwoods with red maple, yellow poplar, ash, sycamore, cottonwood, black gum, water oak, and willow as the principal species.

The use of the stream fishery resource by fishermen is almost entirely confined to the lowermost three miles of Rabon Creek. All streams in the watershed support a warm water fishery, but fishing pressure in these three miles is seasonally high but overall is considered light. Tributaries and the upper half of the main stem of Rabon Creek are classified as dace trickles, while the lower half of the main stem is classified as a sucker stream^{1/}. Above the tributary Dirty Creek, the stream flow is shallow, the channel is filled with sand, and holes with enough water depth to provide fish habitat are rare. Except for immediately adjacent to State Highway 76 crossings, there is no evidence of fishermen use of either North or South Rabon Creeks. Lake Greenwood, at the watershed outlet, provides excellent fishing for largemouth bass, white bass, sunfish, catfish, and pickerel. During the spring months there is a migration of crappie, largemouth bass, and white bass from Lake Greenwood as far as three miles upstream in Rabon Creek.

A study was made of macrobenthic organisms in a 12 mile reach of Rabon Creek from Mill Rock to State Highway 54 crossing. Sampling stations were approximately two miles apart.

^{1/} U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Atlanta, Georgia (letter dated June 5, 1970).

The algal substrate attached to Mill Rock supports a macrobenthic fauna principally composed of Ephemeroptera, Diptera, Planaria, and Simulium. In the gravel riffle immediately below Mill Rock, the same forms were collected with the exception of Simulium. No macrobenthic fauna was found at any of the other sampling stations. The constantly shifting sand bottom that exists throughout most of Rabon Creek is apparently a hostile environment for macrobenthic animals. Since macrobenthic animals are important links in the food chain of fish and other aquatic vertebrates, fish populations of Rabon Creek will, of necessity, be low.

Wildlife habitat consists of bottom land hardwoods, wooded uplands, abandoned fields, and agricultural lands supporting such species as deer, squirrel, bobwhite quail, and rabbit. Hunting pressure is low to moderate. Bottom land hardwoods provide the highest value habitat in the watershed for deer. Mast from sweetgum and water oak in these bottom land hardwoods contribute to the food supply of upland species such as quail. Wildlife den trees are more common in oaks than the other tree species. Cavities suitable for wood duck nesting are rare.

Wildlife species observed in potential impoundment sites were white-eyed vireo, red-eyed vireo, tufted titmouse, flicker, yellow-billed cuckoo, blue jay, downy woodpecker, blue-gray gnatcatcher, yellow-breasted chat, cardinal, chickadee, belted kingfisher, Carolina wren, wood peewee, and yellowthroat. The most numerous winter birds indigenous to this kind of habitat are several species of sparrows. The wood duck population is low, and other waterfowl species are absent in this watershed because of lack of suitable wetlands. It is possible a low population of woodcock is present during the winter months.

There has been a gradual increase in the number of deer and wild turkey during the last 15 years, and huntable populations now exist. Conversion of upland fields to forests contributes to favorable conditions for deer and wild turkey.

The number of other kinds of wildlife in the flood plains is limited because of the type of habitat. There is a fair to good population of gray squirrel and opossum and a low population of raccoon. There is a high population of chipmunks along the upland edges of the flood plain.

No species on the current list of endangered wildlife species are known to occur in the watershed. It is possible, on rare occasions, that a peregrine falcon could be a temporary winter visitor.

About one half of the watershed is in the Central Piedmont Hunt Unit. There are 22 game management areas within the watershed consisting of approximately 10,000 acres which have increased the wildlife population in the watershed. Deer and wild turkey hunting are allowed in these game management areas. Hunting in these areas requires the purchase of a permit in addition to the regular hunting license. Game management area regulations are enforced in this area.

Economic Resources

The Public Works Commission of the city of Laurens owns about 170 acres of land at its pumping station on Rabon Creek. The remaining area is in private ownership. Industrial timber companies own about 3,000 acres of forest land.

Types of farms range from the small part-time farming units to larger full-time family-sized units. There are about 250 farms in the watershed with an average size of 200 acres. In addition, there are about 400 small tracts used primarily as rural homesites. The value of upland, largely dependent upon location, ranges from \$200 to more than \$2,000 per acre along major roads and near towns. Flood plain land values range from \$150 to \$800 per acre. The average farm value is about \$65,000.

The land is presently being used as follows:

Land Use	Total Watershed		Flood Plain	
	Acres	Percent	Acres	Percent
Crops	11,100	13	130	2
Pastures	15,400	18	1,680	26
Forests	53,000	62	4,400	69
Other Uses	6,000	7	190	3

Principal crops grown are cotton, small grain, corn, grain sorghum, and soybeans. Beef cattle, dairy and poultry enterprises are also important. In recent years, the production of livestock, grain sorghum, and soybeans have increased, while cotton and small grain acres have decreased. Average yields for major crops are as follows:

Crops or Grasses	Unit	Yield	
		Upland	Bottom land
Cotton	Acre	400 lbs.	N/A
Soybeans	Acre	25 bu.	35 bu.
Corn	Acre	65 bu.	90 bu.
All Hay	Acre	1.3 tons	2.8 tons
Pasture	Acre	3 AUM*	5 AUM*

The forests are about 90 percent well stocked with merchantable tree species. Average per acre volumes are as follows: pine sawtimber, 990 board feet; hardwood sawtimber, 157 board feet; pine pulpwood, 454 cubic feet; and hardwood pulpwood, 160 cubic feet.

An excellent network of roads link the watershed with markets in Laurens, Greenville, Anderson, and Columbia. U.S. Highways 76 and 276, numerous primary and secondary highways, and the Seaboard Coast Line

* Animal Unit Month.

Railroad serve the area. Interstate Highways 26 and 85 are within 10 miles of the watershed. Almost all of the roads are paved. Most of the rural homes are built along the roads and accessibility is no problem.

Family incomes in the area are derived mainly from textile manufacturing, agriculture, and supporting activities. Manufacturing plants in Greenville and Laurens and along U.S. Highway 276 furnish off-farm employment and employ approximately one-third of the watershed farmers that are classified as part-time. During recent years, many new homes have been built and occupied by families whose incomes are from off-farm employment. Approximately 84 percent of the commercial farms of the watershed have total value of sales of less than \$10,000. Few farms employ full time labor, but some seasonal labor and custom work are utilized. The annual unemployment rate of Laurens County was 4.2 percent for 1972.

The state is divided into ten planning regions. Laurens County is under the Upper Savannah Regional Planning and Development Council, and Greenville County is under the South Carolina Appalachian Council of Governments. Greenville County was designated as a part of the region with high unemployment and underemployment by the Appalachian Regional Development Act of 1965. Laurens County is in the Upper Savannah Economic Development District, which was organized in 1968 under the Economic Development Act of 1965. Laurens County is a part of the Ninety-Six Resource Conservation and Development Project, which is authorized for planning.

There is considerable potential for promoting community development in this watershed through improved land use and development of water resources. A substantial increase in average farm income as well as off-farm job opportunities are needed before this area can compete favorably with other parts of the state and nation.

Recreational Resources

Recreational resources within the watershed include fishing, hunting, horseback riding, and private or church associated picnic areas. The rock shoal near Mill Rock Church in the central section of the watershed is a locally popular recreation area for wading and picnicking. Farm ponds furnish some water-based recreational opportunities, primarily fishing. Lake Greenwood located just south of the watershed provides good boating, fishing and water skiing opportunities. The nearest state parks are Paris Mountain, Greenwood, and Croft, each of which is located some 40 miles from the watershed. Part of the Sumter National Forest is about 25 miles west.

Archeological and Historical Resources

One historic site within the Rabon Creek Watershed is listed in the National Register of Historic Places^{1/}. It is the Sullivan House, in Laurens County, located on State Highway 54. Several possible archeological

^{1/} National Register of Historic Places, approved for publication in the Federal Register, U.S. Department of the Interior, National Park Service, June 22, 1973.

sites were located during the watershed reconnaissance and in consultation with the Institute of Archeology and Anthropology, University of South Carolina. The Institute investigated these sites and their findings are given in the "Planned Project" section of this statement.

Soil, Water and Plant Management Status

During the last 20 years, there has been a 60 percent reduction in the acres of cotton produced in the watershed. Cotton has been replaced by soybeans, pastures, and grain sorghum. Some of the more eroded fields have been planted to pine trees. A shift from tenant-operated farms has resulted in some larger, more efficient units with specialities in cattle or row crop operations. This is reflected in the following data:

Average Size of Farm and Percent Change; and
Average Number of Farm Tenants and Percent Tenancy 1/

County	-----Acres-----			% Change 1964-1969	Tenants (No.)		% Change 1964-1969
	1959	1964	1969		1964	1969	
Laurens	150	179	235	31	202	33	-84
Greenville	77	89	103	15	161	55	-66

Even though most tenant operations have disappeared, there still remain numerous farm operations where equipment and labor are being employed on land where returns are marginal. These problems stem from small acreages, soil erosion, and flooding of bottom land.

The South Carolina Commission of Forestry, in cooperation with the U.S. Forest Service, through the various federal-state cooperative forestry programs, is providing forest management assistance, forest fire protection and suppression, distribution of planting stock and forest pest control assistance to private landowners in the watershed.

Loan funds are available to eligible landowners through the Farmers Home Administration (FmHA) for helping to finance soil and water conservation practices. The Cooperative Extension Service of Clemson University, through county agricultural extension agents, is assisting with information and educational programs to carry out project objectives. The Agricultural Stabilization and Conservation Service administers the Rural

1/ Selected Census of Agriculture Characteristics, South Carolina 1959-1969.

Environmental Conservation Program which provides cost sharing assistance to qualified landowners for erosion and sediment control practices and improved forest management.

Two soil and water conservation districts serve the watershed. The Greenville County and Laurens Soil and Water Conservation Districts have active programs that encourage the planning and application of conservation measures. Other activities of the districts include cooperative seed purchase for soil conserving grasses, ownership of equipment for installing conservation practices, educational programs, demonstrations, and outdoor classrooms. Both districts have sponsored other watershed projects. Two field offices of the Soil Conservation Service assist the soil and water conservation districts.

Two hundred fifteen landowners and operators are active cooperators with the soil and water conservation districts. One hundred eighty-five of these cooperators have soil and water conservation plans covering approximately 41,000 acres or about one-half the watershed. Approximately 55 percent of the planned land treatment practices have been applied, and 45 percent of the watershed lands are adequately protected from erosion. Soil surveys have been completed for the watershed.

WATER AND RELATED LAND RESOURCE PROBLEMS

Land and Water Management

Freezing and thawing of soils causes heaving on some areas and result in loss of vegetative cover. Some of the soils are subject to gully erosion when runoff water is concentrated. Undesirable vegetation has choked out improved grasses in some pastures and renovation is needed. Critically eroding areas are found in all land uses and need special treatment. Fields with conventional terrace systems need to be smoothed and new water disposal systems, including grassed waterways and parallel terraces, need to be established. Some fields with serious erosion problems need to be farmed by improved methods such as no-till planting or grass based rotations. Marginal units need to change to some other type enterprises.

Approximately 25 percent of the 11,100 acres of watershed upland currently in row crops is in land capability Classes IIIe and IVe (generally slopes from 8 to 15 percent). Farmers cultivating these areas often ignore the drainage patterns and contours of the fields causing serious erosion problems. Special handling of these areas through a combination of cultural and/or mechanical practices is needed for protection of these lands from erosion if cropping is to be continued. At least 1,500 acres of land in Capability Classes IVe and VIe now idle or being used for crops should be planted to grasses or trees because of the erosion problems.

Most farmers in the watershed do not have the financial ability to install the needed land treatment measures without assistance.

Problems in forest land are generally due to a lack of multiple use management that would provide watershed protection as well as economic

and environmental benefits. Scrub or weed trees encroach on the production of more desirable species. Landowners are not harvesting timber on regular schedules. The greatest need of the small forest owner is technical assistance in conservation planning, marking, and marketing timber, removal of scrub or weed trees, planting or interplanting seedlings, and constructing forest access roads and firebreaks. The average annual fire loss index in the watershed for the past 10 years was 0.18 percent. This is within the state goal of 0.25 percent and within the watershed protection goal of 0.20 percent. The South Carolina Commission of Forestry's fire protection and suppression organization in both counties is adequate to cover the fire protection needs of the watershed.

Floodwater Damage

There are 6,400 acres of land in the watershed that are subject to flooding. This flood plain land is along Rabon Creek, North Rabon Creek, South Rabon Creek and their tributaries. More than one-half of the flood plain once used for crops has reverted to less intensive use or is idle. Flood damage to existing crops and pastures causes increased production and maintenance costs, hampers good management practices, and prevents intensive use of much of the flood plain. About 130 acres of flood plain are presently used for crops. A few acres are devoted to truck crops, but most of this area is used for corn and soybeans. There are 1,680 acres used for pastures and hay. About half of this area is of high quality improved grass and the remainder is in native grasses with some brush and tree encroachment. About 190 acres of flood plain land are in roads and utility rights-of-way. The remaining 4,400 acres of the flood plain are in forest. All of the flood plain land is in small private ownership, except for about 300 acres in industrial forest land. No businesses or homes are located in the flood plain.

About 3,500 acres are flooded annually. Some areas, particularly in the lower half of the watershed, flood several times per year. About one-third of the floods occur during the crop growing season. Most of the damage to crops and pastures is caused by floods which occur on the average of once every two years or more often. These frequent floods prevent the planting, cultivation, or harvest of crops, cause loss by drowning of crops, and loss of grazing days by deposits of sediment on grass and wet soil conditions.

Large, infrequent floods cause flood plain erosion and greater sediment deposits as well as major road and bridge damage. Since most of the damageable values are crops and pastures, average annual damages by larger, less frequent floods are not as great as those caused by the smaller, more frequent ones.

Land values in the watershed are increasing rapidly (50 percent to 75 percent in the last five years). Farmers are not able to purchase productive uplands to expand their operations or to replace land lost to homesites or industries. Recent changes and projections indicate that expansion of grassland farming enterprises will take place on the flood

plain. Future land use projections indicate that much of the flood plain land will be used for pastures and feed crops as this area is well suited for the production of beef cattle.

Presently, most of the row crops in the flood plain are above State Highway 101. Pastures are found throughout the flood plain. Much of the flood plain land below U.S. Highway 76 has severe floodwater and sediment problems and is used less intensively.

Average annual crop and pasture damages are estimated to be \$18,100. Other agricultural damages including forest, fences, machinery, cattle losses, sheds, farm roads, and other improvements are estimated to total \$4,700 each year. Nonagricultural damages in the form of scoured road surfaces, erosion of bridge abutments, bridge and culvert washouts, and damages to other properties total \$5,400 annually.

Loss of income from reduced crop production, increased cost of replacement and repairs, and the threat to the health and safety of people, tend to cause the standard of living to be lowered. Incentives to improve the environmental condition are reduced by frequent losses from flooding.

Erosion Damages

Measured in total tons of soil loss, the greatest contributor is sheet and rill erosion from cultivated fields. On about half of the approximately 11,100 acres of cropland in the watershed, erosion rates exceed the tolerable limit of about four tons per acre per year. The most severely eroding cultivated fields often lose as much as 18 tons per acre per year. Erosion from pastures and forests is much less, however, some are eroding to an excessive degree.

The most severe erosion is limited to isolated critical areas such as galled field areas, road cuts, dirt roads, borrow areas, field borders, and gullies. Some of these areas produce as much as 80 tons per acre per year. Field areas with severe problems make up the largest part of this critical area with 333 acres. Critically eroding areas in forests are estimated to be 90 acres. Fifteen acres of dirt roads and road cuts are classed as critical. Eighteen critically eroding gullies (27 acres) have been identified. Flood plain scour is minor and results in average annual damage of only \$300.

The erosion problem within the watershed has been declining due to the conversion of cultivated land to pasture and forest. The general outlook is for erosion to increase as a result of expected urbanization. This would include erosion from construction sites for homes and access roads.

The long range effects of erosion are a decrease in soil fertility and tilth, reduction of crop yields, increase in farm production costs, and the build-up of off-site damages. This type of soil depletion will reduce farm income, degrade aesthetics, and lower living standards for all the people in the watershed.

Sediment Damage

In the uplands of the watershed, sediment damages are confined to terrace channels, road ditches, splays in field draws, and field borders. Over the years, these areas have amounted to several hundred acres. Although most of the areas recover with time, damages are evident. The largest annual expense is incurred by the road departments in maintaining road ditches.

On the flood plains above State Highway 101, moderate sediment damages occur in the form of localized splays. Entrained sediment three or more feet deep exists in channels from Lake Greenwood to State Highway 101 on North Rabon Creek and to the Greenville County line on South Rabon Creek. Loss of channel capacity increases flooding and resultant sediment damages.

Below State Highway 101 on South Rabon Creek to U.S. Highway 76, sediment and associated swamping damages are increasing. These damages, are in the form of overbank deposits, splays and dike induced swamps. Sediment damages are minor on the flood plain of North Rabon Creek between State Highway 101 and U.S. Highway 76.

The flood plains below U.S. Highway 76 along both North and South Rabon Creeks to their confluence have been damaged severely by deep sand deposits.

From the confluence of North and South Rabon Creeks, to the backwaters of Lake Greenwood, a defined channel exists. At present, with the exception of coarse grained sand deposits above and below bridge openings, sediment damages decrease downstream from the confluence.

Sediment deposits have damaged 1,162 acres of flood plain land to some extent. About 140 acres have been damaged severely. Approximately 575 acres have been damaged moderately. The remainder has been damaged slightly. Swamping resulting from sediment deposits along stream banks is causing damage to 100 acres mostly in the lowermost six miles of Rabon Creek. Swamping damages are evident in the loss of timber in the flood plain.

The estimated average annual sediment yield to Lake Greenwood is 93,000 tons or 58 acre feet. The average annual suspended sediment concentration approximately one mile from the watershed outlet is estimated to be 630 milligrams per liter. Annual suspended sediment concentration estimates for other locations are as follows: South Rabon Creek at Payne Branch junction, 570 mg/l; North Rabon Creek one mile north of State Highway 101, 480 mg/l; Rabon Creek at State Highway 252, 310 mg/l; Mountain Creek two miles southwest of Gray Court, 500 mg/l; and at Dirty Creek three miles west of Maddens, 410 mg/l. Other damages caused by this concentration are to the fishery resource and the cost of removing sediment from the domestic and industrial water supply by the Laurens Public Works Commission.

Average annual sediment damages are estimated as follows: overbank deposition, \$5,400; swamping, \$300; and deposition in Lake Greenwood, \$46,400.

Municipal and Industrial Water Problems

Increased population and industrial growth of the watershed and surrounding area has created a need for a dependable source of water. The city of Laurens ran short of water during the mid 1950's, when rainfall and stream flows were extremely low. In recent years, water use has been restricted for short periods. The lack of a dependable water source has prevented industries from locating in the area.

The rural residents of Laurens County and part of Greenville County have organized into a rural water district and are planning to install water lines throughout most of Laurens County. The city of Laurens' present water supply system has a pumping capacity of four million gallons per day and a filtering capacity of five m.g.d. The peak use rate by the city in 1971 was 2.5 m.g.d. A rural water system to be installed and operational in 1976 will require an additional 0.75 m.g.d. The total projected demand on the system by 1976 is five m.g.d.

Seventy percent of the raw water supply is obtained from Rabon Creek with the remaining 30 percent being pumped from Little River in normal seasons. During periods of drought, Little River has little or no flow and all of the water is obtained from Rabon Creek.

Within Laurens County, two floodwater retarding structures which include storage for municipal and industrial water are planned. One is a structure in Beaverdam-Warrior Watershed project having a potential to provide 2.1 m.g.d., and the other is a structure on Reedy Fork Creek, a tributary of Little River with a potential of providing 1.2 m.g.d. By the year 2000, it is anticipated that the population of Laurens County will increase from its current level of 49,700 to 76,000. This increase in population and expected industrial growth will create a demand for 20 million gallons of water per day^{1/}.

Recreation Problems

As described in the "Environmental Setting" section, water in Rabon Creek is presently classified as unsuited for contact sports such as swimming and skiing. Also, during normal summer months, potential swimming areas are widely scattered, small, and mostly inaccessible. Suspended sediment in most of the ponds discourages the use of the water for recreation. Lake Greenwood is available for public use, but facilities and access are limited.

The population within 50 miles of the watershed is 750,000, which represents a significant demand for recreation. The Laurens County Water Resources Commission is interested in developing water based recreational

^{1/} Population projections were made during the Santee River Basin Study. Water demands were estimated by the Upper Savannah Regional Planning and Development Council, and the engineering firm assisting the Laurens County Water Resources Commission.

facilities. The Laurens County Legislative Delegation has expressed support for improving recreational opportunities. The soil and water conservation district commissioners in both districts have, as one of their objectives, the improvement of recreational opportunities. The Greenville County Recreation Commission has expressed some interest in developing recreational areas in the southern part of Greenville County. The statewide Comprehensive Outdoor Recreation Plan^{1/} identified a need for a state park in the general vicinity of the Rabon Creek Watershed. Laurens County has no state park or any substantial public recreational areas at present. The population of the general area is increasing faster than the state average. There is a definite need for a water based recreation development in this area.

Plant and Animal Resource Problems

Habitat for some wildlife species has been altered through the conversion of open land, idle land, or hardwood forest to solid plantings of pine. Also, some flood plain hardwood sites have been cleared for pasture resulting in a loss of this type of wildlife habitat.

Sediment deposits in streams have damaged fish habitat by filling holes and causing shallow flows. In some areas, the stream fishery has been eliminated by sediment deposits. Lake fishing opportunities within the watershed are limited. Even though Lake Greenwood is close by, the demand for lake fishing by the year 2000 will far exceed the supply. If the demand for hunting opportunities in the future is to be met, a concentrated effort will have to be made to improve and develop wildlife habitat. This is especially true for quail hunting opportunities.

Water Quality Problems

Water quality of all sources is adequate, with proper treatment. Rabon Creek was classified by the South Carolina Department of Health and Environmental Control as a "B" stream. This classification is suitable for municipal water supply. The Beattie Plant of Woodside Mills at Fountain Inn has a permit to discharge 20,000 gallons per day of treated waste into Payne Creek. There are no known sources of untreated wastes entering the stream.

Economic and Social Problems

About 84 percent of the commercial farms are low producing units with annual sales less than \$10,000. Farm incomes are lower, on the average, than non-farm incomes. The average annual rate of unemployment in Laurens County has been higher than the state average for the past several years.

^{1/} SCORP-70, South Carolina Department of Parks, Recreation and Tourism, Columbia, South Carolina, 1970.

Listed below are averages for the county and state for the years 1967 through 1972:

Average Annual Unemployment Rate
for Laurens County and South Carolina, 1967 - 1972

Year	Laurens County (percent)	South Carolina (percent)
1967	5.1	4.7
1968	4.7	4.3
1969	4.0	3.9
1970	5.9	5.0
1971	5.7	5.2
1972	4.2	4.1

SOURCE: South Carolina Employment Security Commission

Underemployment is a problem due to farm sizes and efficiency of farming operations. Additional off-farm jobs are needed to absorb the underemployed farm workers. Ninety percent of the owners of flood plain land operate family type or part-time farms.

ENVIRONMENTAL IMPACTS

Conservation Land Treatment

Rates of erosion on uplands will be reduced by the installation of land treatment practices and the stabilization of critically eroding areas. Land treatment measures will reduce floodwater damages by about three percent. Treatment of 465 acres of critically eroding areas will result in a substantial reduction in sediment. Gross erosion rates will be reduced by types as follows: sheet erosion on cropland and pastures, 20 percent; erosion of roadbanks and dirt roads, 50 percent; and gully erosion, 50 percent. Less sediment being deposited in lakes and on flood plain land will result in improved fish and wildlife habitat and greater yields from agricultural land. As sediment is reduced, there will be a reduction of chemical and other pollutants being transported downstream.

Upland wildlife habitat will be enhanced by the development and management of 300 acres of wildlife food and cover, other land treatment measures and treatment of critically eroding areas. The quality of water will be improved as vegetation prevents erosion from the watershed.

Structural Measures

A total of 1,555 acres of land will be used for pool areas, dams, and borrow areas in project installation. This total will be used as follows: sediment storage, 371 acres; recreation and municipal and industrial water supply storage, 322 acres; floodwater storage, 811 acres; dams and spillways, 27 acres; and borrow areas above flood pools, 24 acres. An additional 361 acres will be used for recreational areas. The agricultural values will be lost and wildlife values reduced due to the heavy influx of man into this area. The areas committed to sediment, recreation, municipal and industrial water supply storage will be permanently inundated. Existing agricultural values will be lost and wildlife values altered on these areas. The area used for floodwater storage will be inundated periodically but can be used for pasture, forests or wildlife. The dams and spillways are lost to crops or forests but will be established in grass. The borrow areas will be revegetated with grasses, trees, or wildlife plantings. Recreational areas will be managed as natural areas with only the necessary alterations required to install the planned recreational facilities. Land use in the areas inundated is three acres of pasture and 690 acres of forest. Land use in the area that will be occasionally inundated is 98 acres of pasture and 713 acres of forest. Land use in the recreational areas is 17 acres of pasture and 96 acres of forest.

The project measures will reduce floodwater damages on 3,020 acres of flood plain land by an average of 76 percent. For the reaches downstream from Site 20 to the backwater of Structure 32, the area flooded by a storm expected to occur on the average of once in three years will be reduced from 432 acres without the project to 34 acres with the project. For the reaches downstream from Site 21, the acres flooded by the three year storm will be reduced from 323 to 58 acres. For the reaches downstream from Site 32, the area flooded by the three year storm will be reduced from 1,443 to 872 acres.

All of the area for about a quarter of a mile below Site 20 will be protected from storms up to the 100 year frequency. From there to State Highway 101, there will be no flooding by the three year storm and little flooding by the 10 year storm. For the reach downstream from State Highway 101 to the backwater of Structure 32, most of the area will be protected from the two year frequency storm. This area can be used for row crops or improved pastures.

For the reach downstream from Site 21 to State Highway 101, almost all of the flood plain land will be protected from the three year frequency storm. The reach from this point to the backwater of Site 32 will be protected from the one year frequency storm.

On Rabon Creek downstream from Site 32, to the backwaters of Lake Greenwood, the flood plain will have protection from flooding suitable for improved pastures. This land should not be used for row crops because of the remaining flood hazard.

Future flood plain land use without and with the project is

estimated as follows:

	<u>Without Project</u> (acres)	<u>With Project</u> (acres)
Crops	200	400
Pastures	2,000	2,500
Forests	3,700	2,800
Other	500	700

Major crops to be grown in the flood plain are expected to be soybeans, corn, and silage, along with a few acres of truck crops. Pastures will be primarily fescue and clover. Forests will be primarily bottom land hardwoods. It is estimated that the project will result in 700 acres of bottom land hardwoods being converted to crops and pasture. As a result of the reduced flood hazard, the land which will be devoted to crops and pasture will be used more intensively. Improved varieties of seed and better farming techniques will be used. At least 85 farms will be affected by the works of improvement. Net income of farmers will be improved through harvest of higher crop yields and improved quality brought about by more timely planting and harvesting of crops.

Sediment deposition and swamping on the flood plain, affecting about 750 acres, will be reduced 65 percent. Through the reduction of flooding and sediment, most of this land can recover to its former productivity with the addition of fertilizer, lime and the application of good management practices. Sediment yield to Lake Greenwood will be reduced from an average of 58 acre feet per year to 14 acre feet per year, a 76 percent reduction. The estimated average annual sediment concentration will be reduced at a point about one mile from the watershed outlet from 630 mg/l to an average of 160 mg/l. This reduction in suspended sediment will result in improved fish habitat in the backwaters of Lake Greenwood. The aesthetic quality of the backwaters will be enhanced and the reduction in sediment load will increase the life of Lake Greenwood. The cost of treating municipal and industrial water will be reduced. Floodwater damages to roads and bridges will be reduced by about 65 percent.

Water stored in Structure 32 for recreational purposes and the recreational areas will provide an estimated 49,000 visitor days of recreation each year. The major activities will be fishing and picnicking. Other activities will include boating, sight-seeing, hiking, and similar activities. Boat ramps, comfort stations, paved roads, foot trails, parking lots, picnic shelters, and other picnic facilities will be installed. The reservoir and the recreational areas will be open to the general public.

Effects associated with the increase in recreational opportunities include additional waste for disposal and increased travel in the area.

Some incidental recreational opportunities could be available at Sites 20 and 21. Before these sites can be used by the public or organized groups, sanitary facilities must be provided. During periods of prolonged drouths, water impounded in the structures could be used to irrigate crops

or pastures or augment streamflow.

The three structures will inundate 10.2 miles of stream channels. These channels are in the portions of Rabon Creek identified as not being used by fishermen, but are in areas that provide sources of food for fish and wildlife. The structures could interfere with migration of small fish.

Clearing of forests for the lakes to be created by the structures will be 728 acres. About two-thirds of this clearing, or 490 acres, will be on flood plain lands. This represents a loss of about 11 percent of similar bottom land wildlife habitat in the watershed. About 25 acres of the flood plain clearing for Structure 32 will be in two of the wildlife management areas. Approximately two acres of upland forests will be cleared to install recreational facilities.

Forest wildlife habitat will be changed to grassland or cropland type habitat by the clearing of 700 acres of land that will be restored to its former productivity. Stocking of the 693 acres of water in the three structures will provide excellent habitat for bluegill, shellcracker, crappie, largemouth bass, and channel catfish.

The long, and relatively narrow, lakes created by the structures will provide an escape for deer from free-running dogs. Deer readily swim across such bodies of water and thereby lose dogs from their trail.

Although the lakes will only provide a meager supply of waterfowl food, they will provide good resting, loafing, and roosting areas for waterfowl. This is particularly significant for this section of the state where there are few lakes as these to meet such needs of waterfowl.

The edges of the lakes will provide about 40 miles of shoreline habitat favorable for herons, egrets, and shorebirds, which are now absent from the watershed or are in low numbers. A muskrat population can be expected to develop which will contribute to future fur resources.

The temporary floodwater storage area of the structures will not have a significant effect upon motile wildlife species. The water will rise slowly enough for all such species to move out of the flood pool area and they will only be denied use of it during the few days needed for the water to recede to normal levels. Most wildlife food and cover plants can survive the temporary inundation. Nests of ground nesting birds and mammals will be destroyed if the flooding should occur during their nesting season. However, as with nests lost to all natural causes, renesting usually takes place quickly.

Water temperature within the structures will be increased due to the increased water surface exposure. This will result in a maximum temperature increase of five degrees downstream from the structures. Evaporation losses will also be greater due to the exposed water surface.

When water is released from the reservoir bottom for low flow augmentation, there will be a noticeable increase of ammonia and carbon dioxide, and a shortage of dissolved oxygen in this water for about 200 yards downstream from the structures. Fish will be forced out of this reach on the rare occasions when water is released.

Economic and Social

Employment opportunities will be increased as a result of the project. Unemployed and underemployed persons will have more opportunities to find jobs or to be more fully employed. Underemployed farmers will be able to better utilize flood plain land for more efficient farming operations. An ample supply of municipal and industrial water will encourage present industries and businesses to expand their operations and will encourage other industries to locate in the community. It is estimated that 110 permanent jobs will result from the project. In addition, construction of the project will provide 50 man-years of employment.

The value of land adjoining the permanent pools will be enhanced. It is estimated that within 5-10 years after the structures are built, 120 homesites will be developed adjacent to or near the pools. Soil surveys indicate that soils in this area are suitable for home sites. Health authorities in the counties maintain control of the type of sewage disposal facilities required to prevent water contamination.

The water stored in Site 32 to supply Laurens County and a small portion of Greenville County will serve an estimated 76,000 people by the year 2000. The water, with an estimated sustained yield of 20 million gallons per day, will be used by residences, businesses, and industries already located in the area as well as those expected to move into the area. The supply of water will help the area take advantage of industrial development opportunities. Additional jobs will be created by expanding industries, newly located industries and expanded businesses.

The quality of water to be stored in Site 32 meets standards set by the South Carolina Department of Health and Environmental Control for domestic and industrial use, with proper treatment.

The construction of new homes and industries, the increase of business activity, and the increase of travel in the watershed will increase the burden of waste disposal and adverse effects associated with greater population and increased travel.

Local secondary benefits in the form of increased business from transporting additional supplies and products and other business activity will accrue to residents of the community.

Enhanced land values, new homes, new and expanded industries, and more business activity will tend to improve the tax base thereby providing more funds for education and other social functions in the community.

FAVORABLE ENVIRONMENTAL EFFECTS

Floodwater damages will be reduced on 3,020 acres of flood plain land by approximately 76 percent. Overbank sediment deposition damages will be reduced by 65 percent. Sediment deposition into Lake Greenwood from the watershed will be reduced by 76 percent. At least 85 family farms will be affected directly from the reduction of flooding.

The water supply will provide a dependable source of water for a

projected population of 76,000 people by the year 2000. The creation of the pools will enhance the value of an estimated 120 homesites.

About 49,000 visitor days annually of recreational opportunity will be created. Some 110 new jobs will be created as a result of the project and 693 surface acres of lake fishery will be created.

ADVERSE ENVIRONMENTAL EFFECTS

Existing agricultural values will be lost and wildlife values will be altered on approximately 744 acres of land used for dams, spillways, sediment pools, the municipal and industrial pool, and borrow areas. There will be some reduction of these values on an additional 811 acres flooded when storm water is temporarily stored. The recreational areas adjacent to Site 32 (361 acres) will be lost with regard to their agricultural values and will be reduced in quality with respect to wildlife due to the heavy influx of man into the area.

About 10.2 miles of streams with subsequent loss of the stream fishery will be inundated by permanent pools. Air quality will be adversely affected for a short time from burning of vegetation from land clearing. There will be increased traffic and road maintenance, especially around the new recreation areas.

ALTERNATIVES

The following alternatives were considered:

1. Accelerated land treatment. This alternative consists of those practices and measures described previously under the heading of "Planned Project - Land Treatment". Impacts from this alternative would be similar to those described for the land treatment portion of the proposed plan. Flood damages would be reduced approximately three percent. Adverse impacts resulting from the irreversible and irretrievable commitment of land to structural measures would be eliminated. Needs for additional municipal and industrial water supply and for increased water based public recreation opportunities would not be satisfied. Cost of this alternative is estimated to be \$754,300.
2. Land treatment, Site 32 and channel enlargement above Site 32. Both North and South Rabon Creeks have an average gradient of about 15 feet per mile. This steep grade combined with the highly unstable soils in the flood plain would necessitate

the installation of numerous grade control structures in order to construct a stable channel. Channel enlargement would also utilize 436 acres of the flood plain area now being used for crops, pasture, and woodland. This alternative which would provide about the same total benefits as the proposed project was estimated to cost \$4,100,000 and would require 1,360 acres.

3. Land treatment, channel work, municipal and industrial water from Lake Greenwood, and stream side recreation. This alternate would not reduce sediment being delivered to Lake Greenwood. Comparable benefits from recreation would not be provided because of lack of sufficient stream flow during dry periods to support a stream side recreational development. This would require clearing 290 acres more bottom land hardwood than the proposed project. Obtaining municipal and industrial water from Lake Greenwood would cost an additional \$2,700,000. This alternate was estimated to cost \$7,000,000 while providing less total benefits.
4. Land treatment, flood proofing, land use compatible with present flooding, and municipal and industrial water from Lake Greenwood. This alternate is about the same as the previous alternate, except that no flood reduction is included and will necessitate land use restrictions to minimize damages. There are no existing authorities to implement land use regulations in the watershed. The only reasonable use of the flood plain which would be compatible with existing flooding is woodland. This use would not be compatible with existing farm units or the economic needs of the area. Uneconomic farm units would be created and relocation of some farmers would be necessary. The only fixed improvements involved are roads and bridges and flood proofing would necessitate enlarging the bridge openings, raising or relocating roads and/or riprapping. The total cost of this alternate is estimated to be \$6,000,000 and would provide about one-half of the benefits expected from the planned project.
5. No project. This alternate would not relieve any of the problems in the watershed. Adverse impacts resulting from the project would be eliminated, but stream channels would continue to fill with sediment and flooding would become more frequent and severe. Sediment from the watershed would continue to be deposited in Lake Greenwood, and municipal and industrial water and recreation needs would not be satisfied. This would result in continued out-migration, unemployment, and additional social problems. The net average annual benefit foregone if this alternate was chosen is \$146,800.

SHORT-TERM VS. LONG-TERM USE OF RESOURCES

The planned project is compatible with projected long term uses of land, water and other natural resources as outlined by the regional planning and development commissions and the Santee River Basin Report.

Long term needs were used in planning for the water supply and recreation development in the watershed. Immediate needs were used in planning for the flood prevention portion of the project. If greater protection from floods is practical in the future, additional structures and channel enlargement could be installed.

The project will be effective in conserving land and water resources throughout and even beyond its designed life. Land treatment systems will help to guarantee the long term productivity of the resources through conservation and protection. With improved management, the forest resource will contribute to the long term needs for wood products. The retarding structures will continue to store floodwater, even after the sediment pools are filled with sediment. The multiple purpose structure and its two recreational areas will, with proper operation and maintenance, function indefinitely in furnishing water supply, recreational opportunities, and any other uses that might place demands on the resource. The reduction of sediment being transported to Lake Greenwood will help to extend the useful life of that lake.

In the Santee-Edisto subregion, five watershed projects have been installed, 17 have been approved, and 48 additional projects have potential for development. There are no known conflicts between the Rabon Creek Watershed plan and any other water resource project in the area.

The 22 completed or planned watersheds cover 863,000 acres, or 5.7 percent of the total area of the subregion. These completed or planned projects have and will significantly retard floodwater runoff, reduce erosion and sedimentation, and will enhance lake fishery in the subregion.

Installation of watershed projects within the subregion results in a loss of bottom land hardwood. When the 22 projects are completed, the cumulative effects will be a 0.6 percent reduction of this resource.

In the Saluda River Basin, of which Rabon Creek is a tributary, there are four watershed projects completed and three being installed. After all these projects are completed and Rabon Creek approved and construction completed, the cumulative effect of reducing sediment into Lake Greenwood, thus enhancing and prolonging the life of the 11,400 acre lake, will be significant.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Approximately 25 acres of forest and two acres of pasture will be committed for construction of the dams and emergency and chute spillways. The area inundated by the sediment and permanent water pools of the three structures will be 690 acres now in forest and three acres now in pasture. Floodwater will periodically cover 713 acres of forest and 98 acres of pastureland. Approximately 17 acres of pasture and 344 acres of forest will be committed to recreational use. Some 10.2 miles of stream channels will be inundated by the three structures. The land required by the structures and spillways and those pool areas normally inundated by water will not be available for other uses during the life of the project. Periodic flooding will prohibit intensive land uses in the flood pools of the three structures. Lands around the recreational area of Site 32 are committed primarily to recreation, but may be used for some secondary purposes not conflicting with the recreational purpose. The potential mineral deposits of granite and vermiculite will be lost for a small area at each of the three structure sites.

CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

General

Throughout the planning period, local public meetings have been held to inform all local interests of the project and to enlist public input into the plan. Newspapers, radio, and television were utilized to help to inform the people of the project. The plan was also coordinated with state and federal agencies.

The Institute of Archeology and Anthropology, University of South Carolina, has received structure site plans with structure site locations and pool elevations. The South Carolina Department of History and Archives was also advised of the project.

The plan was closely coordinated with the U.S. Fish and Wildlife Service and the South Carolina Wildlife and Marine Resources Department. These agencies made a joint study of the watershed. Their recommendations, especially in reference to channel modification, were seriously considered during project formulation. These agencies also made inputs into the preparation of the environmental statement.

The South Carolina Department of Health and Environmental Control has made reports on water quality in Rabon Creek. Their reports indicate that there should be no water quality problems considering intended uses. The Environmental Protection Agency is aware of the plan development.

The U.S. Army Corps of Engineers, District Office, provided an input into the work plan and the environmental statement.

Discussion and disposition of each comment on draft environmental statement

The following agencies were asked to comment on the draft environmental statement:

U.S. Department of the Army - responded
U.S. Department of Commerce - did not respond
U.S. Department of Health, Education, and Welfare - responded
U.S. Department of the Interior - responded
U.S. Department of Transportation - responded
Environmental Protection Agency - responded
Federal Power Commission - did not respond
South Carolina Division of Administration (State Clearinghouse)
 Department of Health and Environmental Control - responded
 Department of Archives and History - responded
 Institute of Archeology and Anthropology - responded
 Land Resources Conservation Commission - responded
 Highway Department - responded
 Department of Agriculture - responded
 Wildlife and Marine Resources Department - responded
 State Planning Division - responded
Advisory Council on Historic Preservation - responded
Office of Equal Opportunity-USDA - did not respond
South Carolina Water Resources Commission - responded
Upper Savannah Regional Planning and Development Council - responded
South Carolina Appalachian Council of Governments - did not respond
Appalachian Regional Commission - did not respond

Each issue, problem or objection is summarized and a response given on the following pages. The original letters of comment appears in Appendix C.



U.S. Department of the Army

Comment: We foresee a potential conflict with the work plan proposals in the area of recreation and water supply benefits. To avoid duplication, the studies by the Corps of Engineers and the Soil Conservation Service will have to be fully coordinated.

Response: The Regional Planning Commission has been active in assisting with planning the Rabon Creek Watershed project. They are aware of the projected need of municipal water and what can be provided by this project and the Reedy Fork project. The recreation included in Rabon Creek project is not the primary purpose, but will utilize a resource created. Efforts will continue to keep all interests involved informed and aware of potential conflict and avoid duplication.

U.S. Department of Health, Education, and Welfare

This proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

U.S. Department of the Interior

Comments provided by the U.S. Department of the Interior have been carefully reviewed. Several additions, changes, and corrections have been made in an attempt to provide a clearer understanding of each of the issues and questions raised. The first three pages of comments relate to the watershed work plan and are specifically covered by comments made on the environmental statement, therefore, responses are given to comments starting with the draft environmental statement.

Comment 1: The statement appears to be adequate and accurate with respect to water resources of the project area. The draft environmental statement does not adequately address the potential impacts on fish and wildlife resources. The final statement should state that implementation of the project will result in the destruction or severe alteration of wetland wildlife habitat in the Rabon Creek Watershed and a concomitant reduction in the diversity of species throughout the watershed.

Response: The watershed project contains bottom land hardwoods, but does not contain Types III and IV wetlands as implied and described in "Wetlands of the United States",

U.S. Department of Interior, Fish and Wildlife Service, Circular 39. It is also implied that the project will reduce the diversity of species throughout the watershed. No evidence is available to support this statement. Our assessment indicates that diversity will be increased because of the aquatic production along the shorelines of the lakes.

Comment 2: We suggest that the final statement clearly acknowledge that food and cover plantings on about 300 acres of uplands will not result in an overall improvement of wildlife habitat in the watershed but will, at best, be a partial substitution for the loss of high quality bottom land habitat.

Response: The 300 acres of food and cover plantings for wildlife habitat, along with all other erosion control and land treatment practices will improve the wildlife habitat over what it would be without these measures. It was not intended that the 300 acres of food and cover plantings would mitigate the bottom land habitat lost.

Comment 3: With regard to fishery resources, the proposed fish pond stocking will not constitute habitat improvement (as stated on page 3, paragraph 7).

Response: Appropriate changes have been inserted to clarify this point.

Comment 4: The final statement should discuss in detail any management plans for the proposed structures and should include supportive data for projections concerning the fishery that is expected to develop. The final statement should also indicate that development of a reservoir fishery will be at the expense of approximately 500 acres of high quality bottom land wildlife habitat.

Response: The management of the lakes is described under "Planned Project, Operation and Maintenance". The development of the project, not the fishery reservoirs, is at the expense of committed areas. This commitment of resources and its impact have been described and further description is not warranted.

Comment 5: The statement gives virtually no information concerning the location of other borrow areas or the proposed measures to stabilize these areas. The final statement should discuss in detail the expected excavation depths of the borrow areas, adjacent land contours, and the proposed plans, including the plant species to be used for stabilization of these areas.

Response: As indicated in the statement, borrow areas will be vegetated. These areas are within 2,000 feet of embankment sites and will not be left with slopes or pits that cannot be maintained in vegetation. See the paragraph regarding vegetation under "Planned Project, Structural Measures".

Comment 6: The draft statement indicates that during periods of low flows reservoir releases will be at least equal to stream flow and implies that this one mode of operation will insure the maintenance of downstream aquatic productivity.

Response: The statement was misleading and has been modified. In addition, the design of Structure 32 has been modified to release nine cfs continually, which is the estimated 7-day, 10-year low flow. (See Addendum.)

Comment 7: The final statement should contrast the proposed reservoir releases with historic flows in quantitative terms, since the continued downstream productivity of timber and fish and wildlife resources is dependent upon certain seasonal fluctuations of flows and periodic inundation of bottom land areas.

Response: Flooding will not be eliminated. Seasonal fluctuations of flows and periodic inundation of bottom land will continue to occur, but at less frequent intervals with reduced stages after project installation. Frequency of bottom land flooding will vary from more than once each year to about once in three years, depending upon the location of the bottom land area to the structures.

- Comment 8: The final statement should discuss in depth any actions that can be taken by the Soil Conservation Service to insure sponsor compliance with the signed agreements and to prevent the initiation of poor land practices associated with future development of the watershed.
- Response: The Soil Conservation Service does not sign agreements with landowners. The agreements are between the landowners and the soil and water conservation districts. Technical assistance is provided by the Soil Conservation Service through the soil and water conservation districts in working with landowners and operators in carrying out the plans. The soil and water conservation districts and the Soil Conservation Service encourage private landowners to install needed conservation measures. See letters of commitment by State Conservationist and Laurens Soil and Water Conservation District which are attached.
- Comment 9: The environmental statement includes a brief discussion of geology and somewhat more detail on soils, but fails to take up the interrelations of these natural conditions with the siting and construction of the three dams, a new bridge, and the access roads including human safety.
- Response: The geologic features and soil conditions were investigated as a prerequisite for selection of structure sites and access roads. The proposed embankments were located based on geologic and economic features. No unique or scenic geologic or topographic features occur within the construction areas. All contracts involving federal funds have detail regulations providing for human safety.
- Comment 10: The statement's discussion of plant and animal resources of the project area is inadequate and should be prefaced with a detailed vegetative cover-type map of the entire watershed.
- Response: The land use at present for the watershed and the flood plain is included under "Economic Resources". Also, under "Environmental Impacts, Structural Measures", the future flood plain land use is indicated both with the proposed project and without. In view of the data presented, we feel that such a map is not necessary.

Comment 11: The section "Floodwater Damage", under "Water and Related Land Resource Problems" for the final statement should be completely revised to include a detailed projection of agricultural and employment trends in the watershed over the 100-year project life. It is not possible that the existing economical, social, and environmental setting of the watershed has prompted trends that suggest both a decline and an expansion of flood plain agriculture.

Response: Changes have been made to clarify the statement. For the flood plain, grassland farming is increasing and is expected to continue to increase while row crop farming declines without the project.

Comment 12: A serious deficiency of this section (Floodwater Damage) is the failure to put natural overbank flooding in proper perspective.

Response: By nature of the outline followed, only adverse effects of flooding have been presented under "Floodwater Damage". The environmental setting has been described and the impacts resulting from the project discussed under favorable and adverse environmental effects.

Comment 13: Under "Erosion Damages", the statement indicates that erosion problems have been declining, but are expected to increase.

Response: The comment reflects the intent of the statement. It should be pointed out that the area is expected to develop industrially and commercially without the project. The project probably will encourage more rapid development. Erosion associated with this development is expected. With the project and related land treatment emphasis, the erosion problems will be reduced. The South Carolina Legislature has enacted legislation permitting each county to establish sediment control regulations. The project was evaluated and planned considering the present and expected future erosion rates.

Comment 14: Under "Recreation Problems", the statement indicates that water in Rabon Creek is presently classified as unsuitable for contact sports and that the suspended sediment levels in most of the ponds of the watershed discourage their use for recreation. The final statement should discuss the potential for these same problems within the proposed structures since, as discussed earlier, the expected urbanization and industrialization of the watershed can only compound future water quality problems.

- Response: The outline followed includes only problems under this section. See "Environmental Setting" for additional information on stream classification and state policy regarding water quality criteria to clarify this comment. Body-contact water-based recreation is not the presently planned purpose. It is expected that the water quality will be improved by having the lakes to disseminate pollutants. The current state policy is to improve all stream quality.
- Comment 15: Under "Recreation Problems", the statement is inadequate regarding the effects of the secondary impacts as these effects relate to outdoor recreation interests.
- Response: The "Environmental Impacts" section contains a discussion of this comment.
- Comment 16: The statement that "Flooding destroys habitat for some species of wildlife in the bottom lands", is incorrect in this usage.
- Response: This statement has been deleted.
- Comment 17: Discussions concerning the expected project results in controlling erosion in the watershed appears to be invalid, since the specified land treatment measures are to be funded and installed by the landowners, it is questionable whether the Soil Conservation Service can insure the application of required land treatment measures throughout the project life.
- Response: Representatives of sponsoring local organizations, city, county, state and federal agencies reviewed and analyzed the conservation needs existing and the projected needs of the watershed. The anticipated needs were not ignored. Goals regarding erosion were set for the needed treatment. The sponsors agreed to the proposals made in the Rabon Creek Watershed project and are committed to their installation. When these practices and measures are installed, the results will be as indicated in the statement. Existing going programs offer incentives to landowners to install needed land treatment measures.

Comment 18: The final statement should adequately consider potential long range land use changes and discuss the effects of increased development on operation and maintenance of proposed structures, the productivity of fish and wildlife resources, and benefits associated with erosion and sedimentation control.

Response: Expected land use changes were considered and impacts of the project identified, evaluated, and discussed. See "Environmental Setting, Economic Resources", and "Environmental Impacts".

Comment 19: Under "Environmental Impacts, Structural Measures", discussions concerning floodwater reduction are severely limited in scope since they revolve entirely around beneficial effects related to potential agricultural expansion into the flood plain. In order to present an objective view of the potential environmental effects of floodwater reduction and extension of downstream low flows, this section of the final statement should also consider the effects of altered flow regimens on timber, fish and wildlife and water resources.

Response: Measurable, significant impacts have been considered, identified, and included in the statement. Flooding will not be eliminated but flood stages will be reduced. For example, the three year flood with project will inundate about the same area as the one year without project.

Comment 20: It is our opinion that project operation will degrade the quality of the bottom land and stream habitat not permanently flooded, cleared, or otherwise destroyed or altered by project construction and subsequent watershed development.

Response: See attached letter from South Carolina State Commission of Forestry.

Comment 21: We question your inclusion of incidental land enhancement benefits for Sites 20 and 21 into project economics.

Response: The benefits described are eligible as project benefits. However, they were not necessary for project justification.

Comment 22: Concerning the impact of land clearing for the proposed structures, the draft statement concludes that 11 percent of the bottom land wildlife habitat in the watershed will be destroyed. Superficially this might appear to be a minor loss, but in view of the value of these wetlands to wildlife resources and the fact that bottom land habitat is relatively limited when compared to uplands, this loss will be of major significance.

Response: The loss is significant only to the point that the loss of bottom land wildlife habitat will be slightly over one-tenth of such habitat in the watershed. The comment infers that this is the only bottom land habitat in the area. The stream courses of the watersheds on either side of Rabon Creek Watershed have the same kind of bottom land wildlife habitat as that of Rabon Creek.

Comment 23: The final statement should delineate the location of and specifically discuss the existing vegetative types and past land uses of the 700 acres of forest wildlife habitat considered as "restoration to former productivity". The final statement should also present an in-depth breakdown of all beneficial effects to be associated with the expected clearing of bottom land wildlife habitat.

Response: The specific acres to be cleared are not known at this time. The figure quoted is an estimate of intent to restore formerly cultivated land to agricultural production arrived at through interviews with landowners. Technical assistance will be provided by the Soil Conservation Service through the soil and water conservation districts in working with landowners and operators in developing conservation plans for their land and in carrying out the plans. The land user makes the final decision on what lands will be restored. Therefore, a detailed evaluation of the environmental impacts resulting from land use changes by restoration would be based on assumptions which would produce impractical results.

Comment 24: The draft document indicates that the long narrow lakes created by the project will provide an escape for deer from free running dogs and thereby implies that the proposed structures will provide a valuable deer management tool. However, we question the potential effectiveness or, for that matter, the need for such an "escape facility".

- Response: The use of the lakes by deer as an escape route is given as a fact, rather than imply that it is a deer management tool. Experienced observers have often seen deer effectively use lakes for escape. The watershed has a high population of free running dogs.
- Comment 25: The draft statement suggests that the proposed structures will encourage the development of muskrat populations in the watershed and will thereby contribute to future fur resources. However, in our opinion, the frequently fluctuating water levels, and the limited aquatic vegetation that would be present in the structures will preclude the development of significant muskrat populations.
- Response: Muskrat populations have become established in previously constructed floodwater control impoundments with identical aquatic conditions as expected in the proposed structures. As trapped sediment accumulates at the upper end of such impoundments, extensive areas of plants used by muskrats for food become established.
- Comment 26: The final statement should discuss the potential adverse effects of the expected five degree temperature rise on fisheries downstream of the proposed structures. In addition, the final statement should also indicate whether the Soil Conservation Service has applied to the South Carolina Department of Health and Environmental Control for a variance from the specified five degree maximum temperature for Rabon Creek.
- Response: The five degree temperature rise downstream is based upon research that shows this is the maximum to expect. At most times, the temperature rise will be less than five degrees. As only a warm water fishery resource is involved, this amount of temperature rise will not be detrimental. A similar rise in temperature commonly occurs downstream from ponds and lakes throughout the Piedmont. There are ample reports from current research on thermal affluents that temperature increases of 15 to 20 degrees are necessary before adverse effects begin to appear, and that a slight warming of water temperature has been beneficial to large mouth bass, bluegill, and redear sunfish. No permit will be necessary, as it is not anticipated that temperature increases will exceed five degrees. In addition, the continuous release of nine cfs at Structure 32 will further reduce temperature changes.

- Comment 27: With regard to the proposed residential development of Structures 20 and 21, the draft indicates that land use regulations for the protection of wildlife habitat will be enforced. The final statement should discuss these regulations and should indicate the agency responsible for and the means available for the enforcement of these regulations.
- Response: The statement has been revised. Any land use regulation will require a county-wide ordinance adopted by governing bodies with such authority.
- Comment 28: We suggest that the section, "Adverse Environmental Impacts", be expanded to include a discussion of the aforementioned items concerning anticipated and potential losses to be incurred by fish and wildlife resources if the project is implemented.
- Response: A review of the statement indicates all losses that are significant have been identified and discussed.
- Comment 29: The final statement should undertake a discussion of why suggested possibilities do not exist for project alternatives.
- Response: The alternate suggested by the U.S. Department of the Interior would not provide the same water supply. Reasonable alternatives have been considered and are presented. An alternative does not have to be a potential watershed project that would require some federal funding and technical assistance under Public Law 566. The Soil Conservation Service does not enforce land use regulations. (See response to Comment 8.)
- Comment 30: The draft states that the planned project is compatible with projected long-term uses of land, water and other natural resources as outlined by regional development commissions and the Santee River Basin Report. Such a statement implies that the planned project has been reviewed in detail by and received the concurrence of various technical and administrative bodies concerned with the construction and management of natural resources, including fish and wildlife.

Response: Numerous local, city, county, regional, and state interests have assisted in reviewing and concurring in the proposed project. These include the city of Laurens, Laurens County, Upper Savannah Regional Planning and Development Council, South Carolina Appalachian Council of Governments, South Carolina Water Resources Commission, South Carolina Division of Administration (State Clearinghouse), State Planning, South Carolina Wildlife and Marine Resources Department, South Carolina Department of Agriculture, South Carolina Highway Department, State Land Resources Conservation Commission, and South Carolina Department of Health and Environmental Control.

Comment 31: The environmental statement provides brief information necessary to assess mineral resources and impacts. Proposed operations should result in no significant impact on the local mineral potential. However, the permanent loss of potential mineral deposits of granite and vermiculite should be mentioned in the section pertaining to "Irreversible and Irretrievable Commitments of Resources" when the final statement is prepared.

Response: This has been added to the final statement.

U.S. Department of Transportation

Comment 1: The draft discussed proposals on three road bridges in conflict and three bridge crossings which may be involved, but does not include provision for raising the approaches or making adjustments.

Response: Cost estimates of this work are included in the project plans. These costs are part of land rights costs. The estimates were developed after field review with the district highway engineers of changes needed resulting from the project, and are discussed under "Planned Project, Structural Measures".

Comment 2: The statement should include a discussion of the new primary connector route proposed to pass through the project area.

Response: See response to State Highway Department comment.

Environmental Protection Agency

- Comment 1: We recommend that more suspended sediment measurements be made at other locations in the watershed.
- Response: Additional information has been added to the paragraph giving the estimated annual suspended sediment concentrations for five additional sites within the watershed.
- Comment 2: Additional discussion of water-based recreation should be included in view of existing large lakes within 60 miles of the project area.
- Response: There are several large lakes within 60 air miles of the proposed recreation site. Rabon Creek flows into Lake Greenwood, which is the nearest and only large lake within Laurens and Greenville Counties. The next nearest large lakes; Clark Hill and Hartwell, are more than 50 road miles from the proposed site. Lake Keowee, Lake Jocassee, and Lake Murray are more than 60 road miles from the site. No change has been made. See South Carolina Department of Parks, Recreation and Tourism, SCORP-70, which is referred to in the environmental statement.
- Comment 3: There is no biological information on the benthic community in Rabon Creek. We suggest that a biological investigation be made to determine the community structure of benthos in Rabon Creek.
- Response: The results of a study of macrobenthic organisms in a 12 mile reach of Rabon Creek has been added under "Environmental Setting, Plant and Animal Resources" of the statement and under "Environmental Setting, Fish and Wildlife Resources" of the work plan.
- Comment 4: When is the project planned for Reedy Fork Creek to be finished and what is the possibility of this being a source of water?
- Response: Additional explanation has been added to the paragraph in question.
- Comment 5: Incidental land development, redevelopment benefits, and local secondary benefits listed in the Work Plan should be clarified.

Response: No change has been made. The watershed work plan submitted with each environmental impact statement includes a full paragraph explaining each of the above-mentioned benefits under "Investigations and Analyses, Economics".

Comment 6: The statement should relate the amount of bottom lands inundated to the total amount in the area.

Response: No change has been made. Information on total flood plain present use, expected use with and without the project, and the acres affected is presented in the environmental statement and watershed work plan. See "Environmental Impacts, Structural Measures", and "Short-Term vs. Long-Term Use of Resources" in the environmental impact statement. See also, "Water and Related Land Resources Problems, Floodwater Damage" of the watershed work plan.

Comment 7: If clearing and construction wastes are disposed of by open burning, it should be in accordance with state air pollution regulations. Also, dust generated should comply with applicable standards.

Response: No change has been made. See "Planned Project, Structural Measures", items "a" through "f".

Comment 8: The final comments were regarding the possibility of federal permits being required to proceed with the project pursuant to the Federal Water Pollution Control Acts Amendments of 1972.

Response: As indicated in the statement and work plan, local, state, and federal requirements will be adhered to for all measures involved. No change has been made.

South Carolina Division of Administration

This agency serves as a clearinghouse for state agencies. In this capacity, they received the following responses:

S.C. Department of Health and Environmental Control

This provides an unusual opportunity to utilize soil conservation, flood control, and water supply measures in concert with wastewater treatment measures.

The beneficiary of any one measure tends to benefit from all. Yet, emphasis is on the water primarily as a commodity, and as a destroyer, with only passing acknowledgement of its inherent renewability. The point is that all users are responsible for returning the water to the streams in reusable form and at least cost to all the users. As usual, we are happily providing people and industries with water, but levying no requirement on its treatment after use. After the passage of centuries, we are able to understand that the land must be used over and over again. Applying the same understanding to water is still slow in coming.

S.C. Department of Archives and History

No National Register properties or other properties of historical importance appear to be affected by this project.

Institute of Archeology and Anthropology, University of South Carolina

Comment: There is record of significant sites in or immediately adjacent to this area. Other sites may exist within the area as a thorough search has not been made. The Institute recommends a survey of the project area before construction begins.

Response: Field investigations have been made by personnel from the Institute of specific sites where there were questions as to significant value. No significant sites have been identified that would be involved with the proposed structures.

State Land Resources Conservation Commission

Project consistent with agency plans and policies.

State Highway Department

Comment: Agency requests conference to discuss plans they have for a new primary connector route proposed to pass through the project area.

Response: A conference was held with representatives of the State Highway Department on September 4, 1974, to review plans for a proposed highway. The new highway is proposed several miles from the proposed watershed structures and presents no conflict.

State Department of Agriculture

Project consistent with agency plans and policies.

S.C. Wildlife and Marine Resources Department

Project consistent with agency plans and policies

S.C. State Planning Division

Project consistent with agency plans and policies.

Advisory Council on Historic Preservation

Comment: The Advisory Council requested additional data indicating evidence of contact with the South Carolina State Historic Preservation Officer and that his comments be included in the environmental statement.

Response: Additional information was provided by letter dated July 12, 1974, and comments are included.

South Carolina Water Resources Commission

Several questions were reviewed and discussed in conference. Some changes in wording have been made to clarify the subject being discussed.

Upper Savannah Regional Planning and Development Council

This agency responded, but did not raise any questions or environmental issues.



LIST OF APPENDICES

APPENDIX A - Comparison of Benefits and Costs for Structural Measures

APPENDIX B - Project Map

APPENDIX C - Letters of Comment Received on the Draft Environmental Statement

APPENDIX D - Public Recreation Development Area Map

APPENDIX E - North Rabon Creek Recreational Area Map

APPENDIX F - South Rabon Creek Recreational Area Map

APPENDIX G - Water Wells in Rabon Creek Watershed, Maximum Consumption from Wells and their Chemical Analyses

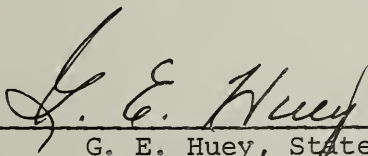
APPENDIX H - Characteristics of Streams in Rabon Creek Watershed

APPENDIX I - Surface Water Quality in Rabon Creek Watershed

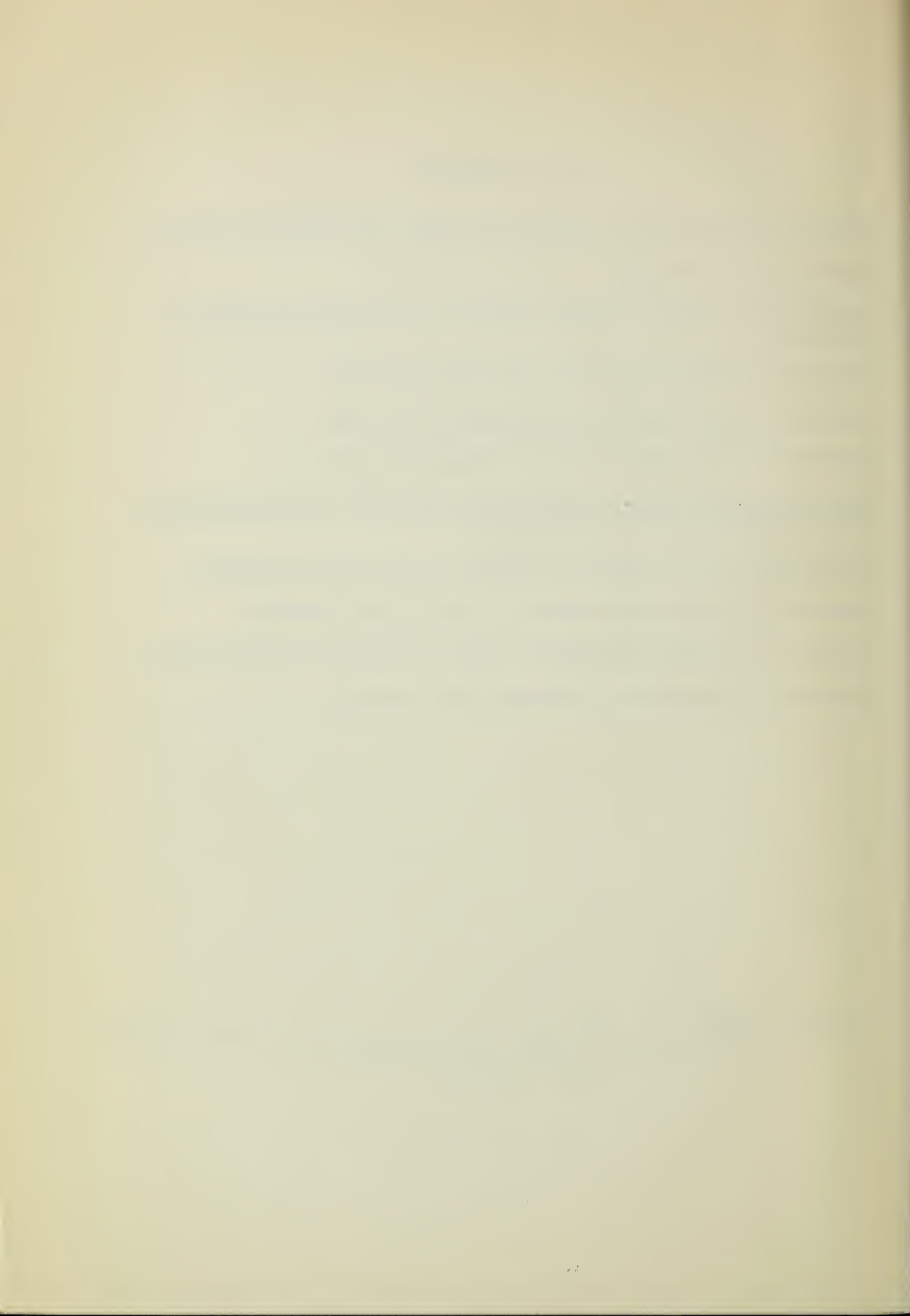
APPENDIX J - Quality Standards for Class "B" Waters in South Carolina

APPENDIX K - South Carolina Drinking Water Standards

APPROVED: _____


G. E. Huey, State Conservationist
SOUTH CAROLINA

DATE 12-3-74



APPENDIX A - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Environmental Statement, Rabon Creek Watershed, South Carolina

Evaluation Unit	(Dollars)							Average Annual Cost 2/	Benefit Cost Ratio	
	AVERAGE ANNUAL BENEFITS 1/									
	Damage Reduction	More Intensive Land Use	Recreation	M&I Water	Incidental Land Enhancement	Secondary	Redevelop-ment			Total
Floodwater Retarding Structures 20 and 21, and Multiple Purpose Structure 32	67,200 3/	31,000	85,800	60,500	5,600	39,300	27,400	316,800	165,700	1.9 to 1
Project Administration	67,200	31,000	85,800	60,500	5,600	39,300	27,400	316,800	170,300	1.9 to 1
GRAND TOTAL									4,600	
1/ Price base - current normalized for crop and pasture damage reduction; current prices for all other values.										
2/ Installation cost based on 1973 prices amortized for 100 years at 5 5/8 percent interest rate; operation and maintenance cost based on 1973 prices.										
3/ In addition, it is estimated that land treatment measures will provide damage reduction benefits of \$3,100 annually.										

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 2/ Installation cost based on 1973 prices amortized for 100 years at 5 5/8 percent interest rate; operation and maintenance cost based on 1973 prices.
 3/ In addition, it is estimated that land treatment measures will provide damage reduction benefits of \$3,100 annually.

April 1974





SITE NUMBERS AND DRAINAGE AREA IN ACRES

SITE NO	ACRES
20	10,765
21	8,781
32	59,514

- LEGEND
- DUAL LANE HIGHWAY
 - PAVED ROADS
 - IMPROVED ROADS
 - UNIMPROVED ROADS
 - FEDERAL HIGHWAY NUMBERS
 - STATE HIGHWAY NUMBERS
 - DRAINAGE
 - WATERSHED BOUNDARY
 - DRAINAGE AREA CONTROLLED BY STRUCTURE
 - AREA BENEFITED
 - FLOODWATER RETARDING STRUCTURE
 - MULTIPLE PURPOSE STRUCTURE (M-MUNICIPAL) (R-RECREATION)
 - SITE NO.
 - RECREATION ACCESS AREA

PROJECT MAP
RABON CREEK WATERSHED
GREENVILLE AND LAURENS COUNTIES
SOUTH CAROLINA

APPROXIMATE SCALE - MILES

Graphic scale bar showing distances in miles.



APPENDIX C - LETTERS OF COMMENT RECEIVED ON THE DRAFT
ENVIRONMENTAL STATEMENT

U.S. Department of the Army
U.S. Department of Health, Education, and Welfare
U.S. Department of the Interior
U.S. Department of Transportation
Environmental Protection Agency
South Carolina Division of Administration (State Clearinghouse)
Advisory Council on Historic Preservation
South Carolina Water Resources Commission
Upper Savannah Regional Planning and Development Council

ADDITIONAL LETTERS OF COMMENT

March 28, 1975 memorandum from State Conservationist
to Area Conservationist and District Conservationists

March 26, 1975 letter from Laurens Soil and Water Conservation
District to State Conservationist

December 20, 1974 letter from South Carolina State Commission
of Forestry to Assistant State Conservationist



G. E. May, USA, Commanding, D. C.

DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310

15 JUL 1974

Honorable Robert W. Long
Assistant Secretary of Agriculture
Washington, D. C. 20250

Control No.

16 - 54534

Reference SC5

Date

AUG 28 1974

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist of South Carolina, by letter of 14 June 1974, requested the views of the Chief of Engineers on the work plan and draft environmental statement for the Rabon Creek Watershed, South Carolina.

As mentioned on page 17 of the watershed work plan, the Charleston District is studying the feasibility of a multiple-purpose reservoir on Reedy Fork at Laurens, South Carolina. We foresee a potential conflict with the work plan proposals in the area of recreation and water supply benefits. To avoid duplication, the studies by the Corps of Engineers and the Soil Conservation Service will have to be fully coordinated.

The draft environmental statement satisfies the requirements of Public Law 91-190, 91st Congress, insofar as this Department is concerned.

Sincerely,

Charles R. Ford
Chief
Office of Civil Functions



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION IV
50 7TH STREET N.E.
ATLANTA, GEORGIA 30323

August 16, 1974

OFFICE OF THE
REGIONAL DIRECTOR

Re: 427-6-74

Mr. G. E. Huey
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

Subject: Rabon Creek Watershed
Greenville and Laurens
Counties
South Carolina

We have reviewed the subject draft Environmental Impact Statement. Based upon the data contained in the draft, it is our opinion that this proposed action will have only a minor impact upon the human environment with respect to the concerns of this Department.

Sincerely yours,

James E. Yarbrough
Regional Environmental Officer



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
ER-74/801

OCT 4 1974

Dear Mr. Huey:

Thank you for your letter of June 14, 1974, requesting our views and comments on the work plan and draft environmental statement for Rabon Creek Watershed, Greenville and Laurens Counties, South Carolina. The Department has reviewed both documents and concludes that the proposal's implementation will seriously degrade a productive flood plain ecosystem. Fish and wildlife habitat offered by the abundant bottom-land hardwood forests has not been afforded thorough consideration during project formulation.

This Department is aware of several less damaging alternatives (discussed below) to the proposal which we believe require further review. We recommend restudy of the proposal leading to incorporation of adequate mitigation of the hardwood forest loss or selection of a less damaging alternative.

Detailed comments on the proposal and the draft environmental statement are presented on the following pages.

Watershed Work Plan

The comments below constitute the official report of the Fish and Wildlife Service, prepared and submitted in accordance with the authority contained in Section 12 of the Watershed Protection and Flood Prevention Act (68 Stat. 666, as amended; 16 U.S.C. 1008).

The Rabon Creek Watershed encompasses an area of about 85,500 acres, of which about 5,000 acres are bottom-land hardwood and about 79,500 are in upland. Of the upland areas, a significant percentage presently supports cropland, pastureland, pine plantation and young pine-hardwood stands. The bottom-land hardwood areas provide by far the most productive wildlife in



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the watershed. Many species of wildlife, including the white-tailed deer, wild turkey, and gray squirrel, are provided food, escape cover, and denning and nesting sites by the bottom-land areas. High-quality wildlife habitat similar to that of the Rabon Creek flood plain is responsible for the recent increase of wild turkey and white-tailed deer in the Central Piedmont Game Management Area, which is managed by the South Carolina Wildlife and Marine Resources Department, and encompasses a large segment of the Rabon Creek flood plain.

Construction and operation of the project will result in the destruction of at least 1,200 acres of the existing 5,000 acres of wetland wildlife habitat. In view of the stated project objective of providing for the establishment of pastureland over most of the wooded flood plain and considering the expected project induced urbanization and industrialization of the watershed, these losses will probably be much greater. Furthermore, flooding reduction provided by the project will degrade the quality of significant additional acreage of wooded wetland habitat. The long-range impacts of the project will be a reduction of carrying capacity for many game and nongame wildlife species, not only in the flood plain but in the entire Rabon Creek Watershed.

Streams in the watershed support a warm-water fishery and fishing pressure is seasonally high but overall light. Signs observed during field investigations by the Fish and Wildlife Service indicate that fishing pressure north of Highway 76 on North and South Rabon Creeks is light and from Highway 76 downstream is moderate to heavy. Creel surveys at Highway 76 indicate that the streams support moderate populations of several centrarchids and catfishes. In addition, surveys by the Fish and Wildlife Service indicate that fish food organisms, primarily representatives of several orders of aquatic insects, are abundant throughout the watershed.

Productivity of the existing stream fishery appears limited because of erosion in the watershed and instream sedimentation. The streams have generally shallow and shifting bottoms, and during periods of heavy runoff become quite turbid. However, construction of the proposed project, in attempting to rectify

existing problems of erosion and sedimentation in the watershed, will result in the destruction of about 10 miles of the existing lotic system. Moreover, operation of the project, which will result in elevated stream temperatures, altered flow regimes, and further watershed development, will potentially degrade additional segments of the stream ecosystem.

Project alternatives are presently available which would satisfy a majority of the projected needs of the area while involving less destruction of fish and wildlife resources. For example, water supplies for the City of Laurens and adjacent areas can probably be developed at existing Lake Greenwood and the proposed Corps of Engineers project on Reedy Creek. Another benefit associated with this water supply alternative would be a more efficient use of area water resources, since evaporation losses from the Rabon Creek impoundment would be avoided. Concerning reservoir-based recreational facilities, Lake Greenwood presently offers this opportunity within 5 miles of the project area and the proposed Reedy Creek Lake would offer similar facilities.

We also feel other options are available for flood protection and erosion control. The most ecologically sound alternative would be the acquisition of the flood plain and the establishment of a natural floodway. Specific damage centers can then be protected from flooding by levees, if justified. Such a solution will provide a balancing of economic development in the flood plain and protection of high valued bottomland wildlife habitat. Hence present and future agricultural, urban or industrial growth can then be accommodated by encouraging wise and more efficient use of upland areas. Present or future local institutions should take the lead role in this alternative. Various organizations including the Soil Conservation Service, South Carolina Wildlife and Marine Resources Department, Forest Service, Fish and Wildlife Service, and regional planning commissions can presently provide technical assistance in solving land use problems while avoiding significant destruction of public resources in the project area.

Draft Environmental Statement

General

The draft statement discusses and assesses project impacts on water, geological, mineral, recreational, and fish and wildlife resources in varying degrees of adequacy. The following comments will set forth the adequacy or inadequacy and make suggestions for improvement.

The statement appears to be adequate and accurate with respect to water resources of the project area.

The draft environmental impact statement does not adequately address the potential project impacts on fish and wildlife resources. The stated project objectives (page 1) are to improve the economic and environmental conditions of the community through water and related land resource conservation and development. Moreover, a specific project objective outlined on the same page of the draft will be "To provide flood protection to the degree that most of the flood plain land can be used for improved pasture." When weighed against the destruction of bottomland hardwood forests and the alteration of a natural and productive flood plain ecosystem, we cannot agree that the objective, one of environmental improvement, will be achieved by this project.

Based on an in-depth review of the project area and the draft environmental impact statement, it is apparent that the proposed project will be significantly deleterious to the wildlife resources of the Rabon Creek watershed. The Rabon Creek flood plain presently supports an extensive bottomland hardwood forest, provides the best quality wildlife habitat in the general project area, and offers a number of consumptive and nonconsumptive wildlife associated recreational activities. However, the draft statement has failed to discuss the merits of maintaining and managing these existing resources.

This deficiency allows the proposed watershed project to be viewed in a very narrow perspective concerning several project associated features which are not compatible with a fluctuating water ecosystem. The final statement should state that implementation of the project will result in the destruction or severe alteration of wetland wildlife habitat in the Rabon Creek watershed and a concomitant reduction in the diversity of species throughout the watershed.

Planned Project

Land Treatment Measures

Statements in this section appear to indicate that certain land treatment measures will result in the improvement of fish and wildlife habitat in the project area. With regard to wildlife resources, there is little discussion in the draft statement concerning these measures other than "food and cover" plantings which are proposed on about 300 acres of land. Although this proposal is commendable, sufficient information pertaining to these measures is not

included to permit a valid assessment of their effectiveness. We suggest that the final statement clearly acknowledge that food and cover plantings on about 300 acres of uplands will not result in an overall improvement of wildlife habitat in the watershed but will, at best, be a partial substitution for the loss of high quality bottomland habitat.

With regard to fishery resources, the proposed fish pond stocking will not constitute habitat improvement (as stated on page 3, paragraph 7). We do agree that construction of three floodwater structures will provide a new reservoir fishery in the Rabon Creek watershed. However, the potential for management of these impoundments will be limited, and the resulting fishery will probably be of marginal quality. The final statement should discuss in detail any management plans for the proposed structures and should include supportive data for projections concerning the fishery that is expected to develop. The final statement should also indicate that development of a reservoir fishery will be at the expense of approximately 500 acres of high quality bottomland wildlife habitat.

Structural Measures

This section of the draft statement indicates that borrow materials for construction of the proposed structures will be obtained from excavated spillways and "other borrow areas" near the proposed structures. The statement gives virtually no information concerning the location and proposed measures to stabilize the "other borrow areas", except that on page 9 it is indicated that 20 acres of woodlands will be used for borrow. The final statement should detail the location of these areas including a categorical presentation of the type woodland to be destroyed. Moreover, the final statement should discuss in detail the expected excavation depths of the borrow areas, adjacent land contours, and the proposed plans, including the plant species to be used for stabilization of these areas.

Operation and Maintenance

Discussions concerning proposed operation of the project structures are not in sufficient substance and detail. The draft statement indicates that during periods of low flows reservoir releases will be at least equal to stream flow

and implies that this one mode of operation will insure the maintenance of downstream aquatic productivity. However, the draft statement does not define what is considered a low flow and does not address the effects of reservoir operation on downstream flows during periods of normal or high flows.

The final statement should contrast the proposed reservoir releases with historic flows in quantitative terms, since the continued downstream productivity of timber and fish and wildlife resources is dependent upon certain seasonal fluctuations of flows and periodic inundation of bottomland areas. Contrary to the implications of this section, the maintenance of downstream fishery productivity is not dependent on maintenance of normal low flows during normal low flow periods. Information which is needed to make a determination of the effects of reservoir releases to downstream fisheries and which should be incorporated into the final statement includes the expected reservoir induced increases in the duration and frequency of low flows, the annual distribution of reservoir induced low flow periods, the expected decreases in frequency and duration of overbank flooding and the acreage of bottomland areas to be affected by reduced flooding on an average annual basis.

It is our understanding that prior to providing technical assistance for the construction of planned structural measures, the Soil Conservation Service must enter into a written agreement which requires the landowners to carry out land treatment plans on at least 50 percent of the area above each structure. Furthermore, it is our understanding that the cost of installing land treatment measures will be borne by the landowners and such measures as stripcropping, no-till planting, land smoothing, and field borders will have to be continually applied throughout the project life to realize the projected project benefits. The final statement should therefore discuss in depth any actions that can be taken by the Soil Conservation Service to insure sponsor compliance with the signed agreements and to prevent the initiation of poor land practices associated with future development of the watershed.

Environmental Setting

Physical Resources

The environmental statment includes a brief discussion of geology and somewhat more detail on soils (p. 13-15) but fails to take up the interrelations of these natural

conditions with the siting and construction of the three dams, a new bridge, and the access roads. Foundation conditions at the proposed dam sites are mentioned briefly in the Watershed Work Plan (p. 58) but similar environmental aspects of road and bridge construction are not developed. Especially in regard to dams, not only economical construction and environmental conservation but also human safety are involved, and these matters should be given at least summary treatment in the environmental statement.

Crushed stone and sand gravel are currently produced in Greenville County and a past production of mica and clay is also known. Mineral production in Laurens County consists of vermiculite and stone. While no production currently exists, there are possible commercial deposits of vermiculite and granite in the project area. The statement, on page 15, indicates that crushed granite and vermiculite are being mined in upland areas east of the watershed near Laurens.

Plant and Animal Resources

The statement's discussion of plant and animal resources of the project area is inadequate and should be prefaced with a detailed vegetative cover-type map of the entire watershed. An important point that should be emphasized in the final statement is that the existing watershed is composed of extensive agricultural areas and forests in various stages of succession (including a significant percentage of pine plantation and young pine-hardwood stands), and that the Rabon Creek flood plain provides the best quality wildlife habitat in the general project area. The fact that the periodically inundated bottomland type is limited (5,000 acres vs. 85,500 of watershed) and that these bottomlands provide the necessary requirements to sustain white-tailed deer, wild turkey, gray squirrel, woodcock, and various species of upland game emphasizes the importance of this habitat type to the wildlife resources of the watershed.

Water and Related Land Resource Problems

Floodwater Damage

This section of the draft statement indicates that more than one-half of the flood plain once used for crops has reverted to less intensive use or is idle and that overbank flooding has prompted this decline of flood plain agriculture. Since the majority of the land in the flood plain is in small family type ownership, the decreased intensity of flood plain

agricultural usage might be partially attributable to an increase in off-the-farm employment in the nearby highly industrialized areas. It is our understanding that for the entire watershed, nonfarm incomes presently are on the average higher than farm incomes. Nevertheless, a decline in flood plain agricultural usages, for whatever reasons, apparently has taken place.

Later presentations in this section of the draft statement apparently contradict these discussions by stating "Trends indicate that expansion of farming enterprises will take place on the flood plain." It is not possible that the existing economical, social, and environmental setting of the watershed has prompted trends that suggest both a decline and an expansion of flood plain agriculture. The latter statement alluding to trends suggesting expansion appears to provide an unrealistic basis on which project justification rests.

This section of the final statement should be completely revised to include a detailed projection of agricultural and employment trends in the watershed over the 100-year project life. The section should also delineate the developed and agricultural flood plain areas that are currently being damaged by overbank flooding and those areas that will be damaged in the future with and without the project.

A serious deficiency of this section is the failure to put natural overbank flooding in proper perspective. Instead of discussing only the adverse effects of flooding to agricultural areas, roads, buildings, and residences, the final statement should recognize overbank flooding as a natural ecosystem phenomenon which increases the growth of bottomland hardwood timber, the productivity of wildlife and fishery resources, the recharging of ground water supplies, and the quality of stream waters.

Erosion Damages

This section of the statement indicates that erosion problems in the watershed have been declining due to the conversion of cultivated land to pasture and forestland but are expected to increase in the future due to urbanization. Elsewhere in the statement, comments are made to the effect that the proposed project will encourage industrial and commercial development of the watershed. We expect that such development will further compound the foreseen erosion problems.

Recreation Problems

This section indicates that water in Rabon Creek is presently classified as unsuitable for contact sports and that the suspended sediment levels in most of the ponds of the watershed discourage their use for recreation. The final statement should discuss the potential for these same problems within the proposed structures since, as discussed earlier, the expected urbanization and industrialization of the watershed can only compound future water quality problems.

We find the statement to be inadequate regarding the effects of the secondary impacts as these effects relate to outdoor recreation interests. Noting the 750,000 population within the 50-mile project radius, that includes the cities of Greenville and Laurens, we foresee a significant demand for second home development due to the proposed project's resource attractiveness. Such development is often of haphazard design contributing to resource degradation thus resulting in diminished recreation experiences.

Plant and Animal Resource Problems

We heartily concur with the statement in this section that if the demand for hunting opportunities in the future is to be met, a concentrated effort will have to be made to improve and develop wildlife habitat. Such an effort is particularly needed for the conservation and management of presently restricted wetland areas, including periodically inundated bottomlands.

The statement that "Flooding destroys habitat for some species of wildlife in the bottomlands," is incorrect in this usage. This appears to exaggerate the benefits of flood control in the Rabon Creek flood plain and overlooks an important ecological principal. Competitive exclusion dictates that all the wildlife species in a given area cannot have similar habitat requirements. In this regard, natural overbank flooding cannot destroy habitat for strictly upland wildlife species since upland habitat never occurs in wetland areas. However, numerous wildlife species of the Rabon Creek watershed, including the white-tailed deer, wild turkey, gray squirrel, raccoon, gray fox, wood duck, woodcock, and various song birds, and nongame species are dependent on the continued productivity of periodically inundated bottomlands. In view of the high productivity and relative scarcity of prime bottomland areas, the appropriate place for management of upland species is on any of the more abundant upland areas of the watershed.

Environmental Impacts

Conservation Land Treatment

Discussions concerning the expected project results in controlling erosion in the watershed appear to be invalid. This section categorically states that sheet erosion will be reduced by 20 percent, erosion of roadbanks and dirt roads reduced by 50 percent, and gully erosion reduced by 50 percent. However, since the specified land treatment measures are to be funded and installed by the landowners, it is questionable whether the Soil Conservation Service can insure the application of required land treatment measures throughout the project life. Moreover, as previously mentioned, the calculations concerning reduction of erosion are based upon existing land practices and appear to ignore the anticipated increase of erosion associated with the future urbanization and industrialization and agricultural usage of the watershed after project construction.

The final statement should adequately consider potential long range land use changes in the watershed and should discuss the effects of increased watershed development on operation and maintenance of the proposed structures, the productivity of fish and wildlife resources, and the realization of projected project benefits associated with erosion and sedimentation control.

Structural Measures

Discussions in this section concerning floodwater reduction are severely limited in scope since they revolve entirely around beneficial effects related to potential agricultural expansion into the flood plain. In order to present an objective view of the potential environmental effects of floodwater reduction and extension of downstream low flows, this section of the final statement should also consider the effects of altered flow regimens on timber, fish, and wildlife and water resources. The productivity of bottomland hardwood areas is related to periodic inundation and deposition of stream-borne alluvial nutrients. Many wildlife species are in turn dependent on the abundant food and cover, particularly during abnormally dry periods, provided by the naturally functioning flood plain system. In addition, periodic overbank flooding and bottomland nutrient exchange provide for the sustenance of stream fishery resources.

Information supplied by your staff indicates that proposed operation of the structures will reduce the average annual inundation of flood plain lands by 2,172 acres and that some downstream areas will receive protection from a 100-year frequency flood. Considering this information, it is our opinion that project operation will degrade the quality of the bottomland and stream habitat not permanently flooded, cleared, or otherwise destroyed or altered by project construction and subsequent watershed development.

Considering the recreational aspects of the proposed structures, the draft statement indicates that some recreational opportunities could be available at Sites 20 and 21 where plans are presently in existence for private residential developments. However, representatives of the Soil Conservation Service have stated that there are presently no plans for any recreational facilities at these sites, and it appears doubtful that such facilities will be provided. For this reason we question your inclusion of incidental land enhancement benefits for these sites into project economics. It is our understanding that to claim these benefits at the proposed structures, full public access and recreational facilities must be provided. Perhaps the final statement can clarify this point.

Concerning the impact of land clearing for the proposed structures, the draft statement concludes that 11 percent of the bottomland wildlife habitat in the watershed will be destroyed. Superficially this might appear to be a minor loss, but in view of the value of these wetlands to wildlife resources and the fact that bottomland habitat is relatively limited when compared to uplands, this loss will be of major significance.

This section of the draft statement further indicates that the expected conversion of 700 acres of forest wildlife habitat to grassland or cropland is considered "restoration to former productivity." This term implies that these lands have recently been in agricultural use and, for various reasons, are now less intensively managed for agriculture. Contact with members of the Soil Conservation Service reveals that the SCS does not have information concerning the exact location of the lands to be "restored" except that some of the lands are in bottomland hardwood areas.

Assuming that the SCS does not have specific information concerning the past land uses in these areas, it seems incorrect to suggest that these actions can be called restoration to former productivity. Furthermore, since some of this area probably supports mature bottomland hardwoods, the validity of factoring "restoration" benefits into project economics seems questionable. The final statement should delineate the location of and specifically discuss the existing vegetative types and past land uses of these 700 acres of land. The final statement should also present an in-depth breakdown of all beneficial effects to be associated with the expected clearing of bottomland wildlife habitat.

The draft document indicates that the long narrow lakes created by the project will provide an escape for deer from free running dogs and thereby implies that the proposed structures will provide a valuable deer management tool. However, we question the potential effectiveness or, for that matter, the need for such an "escape facility." Studies conducted in various states have shown that running by dogs has no measurable effect on the productivity of white-tailed deer herds. We suggest that the primary consideration for deer management in the Rabon Creek watershed should be the conservation and management of the existing high quality bottomland habitat.

The draft statement suggests that the proposed structures will encourage the development of muskrat populations in the watershed and will thereby contribute to future fur resources. However, in our opinion, the frequently fluctuating water levels, the potential turbidity of the waters, and the limited aquatic vegetation that would be present in the structures will preclude the development of significant muskrat populations.

With respect to stream temperatures, the final statement should discuss the potential adverse effects of the expected 5 degree temperature rise on fisheries downstream of the proposed structures. In discussing this aspect of the project, the final statement should acknowledge the fact that future streamside clearing will also contribute to elevated stream temperatures. In addition, the final statement should also indicate whether the Soil Conservation Service has applied to the South Carolina Department of Environmental Health and Control for a variance from the specified 5 degree maximum temperature for Rabon Creek.

Economic and Social

With regard to the proposed residential development of structures 20 and 21, the draft indicates that land use regulations for the protection of wildlife habitat will be enforced. The final statement should discuss these regulations and should indicate the agency responsible for and the means available for the enforcement of these regulations.

Adverse Environmental Impacts

We suggest that this section be expanded to include a discussion of the aforementioned items concerning anticipated and potential losses to be incurred by fish and wildlife resources if the project is implemented.

In summary, the adverse environmental effects of construction and operation of the project include: total destruction of at least 500 acres of bottomland wildlife habitat by project construction; the eventual destruction of significant acreage of bottomlands for agricultural purposes; the degradation of remaining bottomland areas by reduced overbank flooding; a concomitant reduction in the productivity of big game, wetland, and some upland wildlife species; the inundation of 10.2 miles of a natural stream; and the potential degradation of remaining stream fisheries due to elevated stream temperatures and altered flow regimes. In addition, the anticipated future urbanization and industrialization encouraged by the watershed project will contribute to additional losses of fish and wildlife resources.

Alternatives to the Proposed Action

The draft statement has presented a reasonable listing of available project alternatives. However, in most cases, the various alternatives are presented in an unfavorable light due to economic concerns, with little objectivity applied to their environmental impact. The following statements listed under Alternative 4, which consists of land treatment, flood proofing, land use compatible with present flooding, and municipal and industrial water from Lake Greenwood, exemplify the inadequacies of this section.

This "...will necessitate land use restrictions to minimize damages. There are no existing authorities to implement land use regulations in the watershed. The only reasonable use of the flood plain which would be compatible with existing flooding is woodland. This use would not be compatible with existing farm units or the economic needs of the area. Uneconomic farm units would be created and relocation of some farms would be necessary..."

We assume that since Alternative 4 was considered in the draft statement that it is a potential watershed project that would require some Federal funding and technical assistance from the Soil Conservation Service. In that respect, the first two statements in the quoted series above need clarification. Earlier in the statement the following comments are found:

(page 11)--"The Laurens and Greenville County Soil and Water Conservation Districts will be responsible for maintenance of the sites where critical area treatments will be applied."

(page 38--Draft Work Plan)--Prior to the construction of any planned structural measures "...The Greenville and Laurens Soil and Water Conservation Districts must obtain agreements with landowners to carry out soil and water conservation plans."

(page 30--Concerning residential development of Sites 20 and 21)--"Land use regulations as to type of development for the preservation of land and protection of wildlife habitat will be enforced."

In view of these statements, it appears that under the adopted plan the Soil Conservation Service will have some responsibility for land use regulations and that some entity will enforce land use regulations at proposed Sites 20 and 21. The final statement should undertake a discussion of why these possibilities do not exist for project alternatives.

The preceding comments concerning Alternative 4 are not intended to imply that there are no amenities that might accrue from a comprehensive land and water management project in the Rabon Creek watershed. However, in an earlier section

of this letter, we have listed other alternatives that would accomplish the same objectives as the proposed project without significant destruction or alteration of fish and wildlife values. This section of the final statement should therefore be revised to reflect the full range of possible alternatives and their individual effects on public fish and wildlife resources.

Short-Term vs. Long-Term Use of Resources

This section of the draft states that the planned project is compatible with projected long-term uses of land, water and other natural resources as outlined by regional development commissions and the Santee River Basin report. Such a statement implies that the planned project has been reviewed in detail by and received the concurrence of various technical and administrative bodies concerned with the conservation and management of natural resources, including fish and wildlife. However, since these bodies are not named in the statement, there is no way of ascertaining their awareness of the potential resource destruction associated with the project. Moreover, it is obvious that the planned project should be compatible with the Santee River Basin report findings since this report was generated by the U.S. Department of Agriculture, Soil Conservation Service.

The remainder of this section and the following two sections of the draft are generally deficient in their discussion of the environmental consequences of the proposed project. They should be revised in view of the previously requested information and discussions.

Irreversible and Irretrievable Commitments of Resources

The environmental statement provides brief information necessary to assess mineral resources and impacts. Proposed operations should result in no significant impact on the local mineral potential. However, the permanent loss of potential mineral deposits of granite and vermiculite should be mentioned in the section pertaining to Irreversible and Irretrievable Commitments of Resources when the final statement is prepared.

We trust the foregoing comments will assist you in the processing of this report to the Congress.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "John S. Gandy", is written over a faint, circular official stamp.

Deputy Assistant Secretary of the Interior

Mr. G. E. Huey
State Conservationist
Soil Conservation Service
Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20591
PHONE: (202) 426-2262

20 AUG 1974

Mr. G. E. Huey
State Conservationist
Soil Conservation Service
Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

This is in response to your letter of 14 June 1974 addressed to the Commandant, U. S. Coast Guard concerning the draft environmental impact statement for Rabon Creek Watershed Project, Greenville and Laurens Counties, South Carolina.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Federal Highway Administration had the following comments to offer:

"The review has been coordinated with the South Carolina State Highway Department who have indicated that they previously reviewed the draft environmental impact statement through the A-95 planning process in June, 1974.

"Although the draft discussed proposals on three Federal-aid Secondary road bridges in conflict, viz. Road S-451 (FAS Route 633), Road S-259 (FAS Route 1464), and Road S-312 (FAS Route 1872), no provision for raising the approaches were included. Also, the draft did not discuss adjustments for three bridge crossings of U. S. Route 76 (Federal-aid Primary Route 080-1) which may be involved.

"Additionally, the final environmental impact statement should include a discussion of the effects of the new primary connector route which has been proposed to pass through the project area. A meeting should be set to determine if there is a conflict. Please have the appropriate people contact Mr. N. K. Yobs, Location Engineer - South Carolina Highway Department - Phone 758-3414.

"The final environmental impact statement should contain summary results of further preliminary study between the initiating agency and the highway agency concerning the above comments. Reference should also be included in the summary pertaining to an overall work plan for the roadway-bridge adjustment work."

The Department of Transportation has no further comments to offer nor do we have any objection to the project. However, the concerns of the Federal Highway Administration should be addressed in the final environmental impact statement.

The opportunity to review this draft statement is appreciated.

Sincerely,

A handwritten signature in dark ink, appearing to read "W. E. Caldwell". The signature is fluid and cursive, with the first and last names being more prominent than the middle initial.

W. E. CALDWELL
Captain, U.S. Coast Guard
Deputy Chief, Office of the
Environment and Planning
By direction of the Commandant



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

August 15, 1974

Mr. C. E. Huey
State Conservationist
U. S. Soil Conservation Service
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

We have received the Draft Environmental Impact Statement for the Rabon Creek Watershed in Greenville and Laurens Counties, South Carolina. Although comments from our Agency are due back to you by August 20, we regret that we shall not be able to respond within that time. This letter is to inform you that our detailed comments will be forthcoming on or before September 4.

Sincerely,

A handwritten signature in dark ink, appearing to read "Frank M. Redmond", is written over a circular stamp. The stamp contains the text "JUL 22 1974".

Frank M. Redmond
Review Section
Environmental Impact Statements Branch



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

1421 PEACHTREE ST., N. E.
ATLANTA, GEORGIA 30309

August 26, 1974

Mr. C. E. Huey
State Conservationist
U. S. Soil Conservation Service
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

We have reviewed the Draft Environmental Impact Statement for Rabon Creek Watershed in Greenville and Laurens Counties, South Carolina and find that we have environmental reservations concerning several areas for which there is insufficient information. This information should be provided so that the impact of the project can be fully assessed.

Specifically, our comments are as follows:

1. In the Watershed Work Plan (page 14) it is stated that the "average annual suspended sediment concentration approximately one mile from the watershed outlet is estimated to be 639 mg/l". We recommend that there should be more suspended sediment measurements made not only at this site but in Rabon Creek, South Rabon Creek, North Rabon Creek, Mountain Creek, and Dirty Creek.

2. It is stated (page 15) that "there is a definite need for a water-based recreation development in the areas." In view of the fact that four relatively large lakes are within 60 miles of the project area--Lake Hartwell, Lake Keowee, Lake Jocassee, and Lake Murray--we believe further discussion of this need should be included in the final EIS.

3. There is no biological information on the benthic community in Rabon Creek. We suggest that a biological investigation be made to determine the community structure of benthos in Rabon Creek. This would aid in evaluation possible effects the project might have on the aquatic system.

4. It is stated (page 14) that there is a need for a source of municipal and industrial water supply for Laurens County. In a further statement (page 14) it is revealed that

2.

a multi-purpose floodwater-retarding and municipal and industrial water supply reservoir which would yield 1.25 mgd is planned for Reedy Fork Creek. When is this project to be finished, and what is the possibility of this being a source of water?

5. Such items as "incidental land development", "re-development benefits", and "local secondary benefits" listed in the Work Plan as benefits should be clarified. The functions or services represented in such benefits should be discussed.

6. Since the impoundments will affect substantial acreage of bottomlands by inundation and reduced downstream flooding, the Statement should relate the amount of this habitat to be altered to the total amount in the area.

7. If clearing and construction wastes are disposed of by open burning, it should be in accordance with State air pollution regulations. Also, dust generated from construction equipment and related operations should comply with applicable standards.

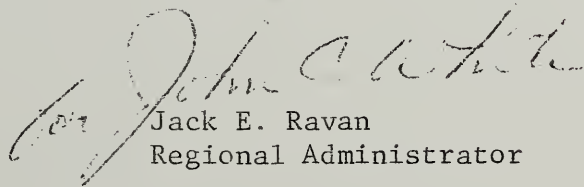
In addition, we would like to point out that if the project is to proceed, appropriate Federal permits may be needed pursuant to the Federal Water Pollution Control Acts Amendments of 1972 (FWPCA). Rabon Creek is "waters of the United States" into which "...the discharge of any pollutant by any persons shall be unlawful" under Section 301(a) FWPCA. A violation of Section 301(a) of the FWPCA will occur unless a Federal permit is obtained for the discharge of pollutants into Rabon Creek itself. Any discharge of dredged material or of fill material that fills or blocks bypassed portions of the stream's natural channel may require a Section 404 permit from the U.S. Army Corps of Engineers. Discharges of pollutants other than dredged or fill material into Rabon Creek may require Section 402 (NPDES) permits from the Environmental Protection Agency.

We request that the final EIS clarify the planned methods of construction of the project and indicate if construction will result in discharges of dredged or fill material or of pollutants other than dredged or fill material. Utmost care should be taken to prevent spoil, etc., deposited on stream banks from washing or falling back into the stream since this may result in violation of Federal laws. The status of any required Federal permits should also be discussed in the final EIS.

3.

We would appreciate receiving five copies of the final environmental impact statement when it is available. If we can be of further assistance in any way, please let us know.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jack E. Ravan". The signature is written in dark ink and is positioned above the printed name and title.

Jack E. Ravan
Regional Administrator

State of South Carolina
Office of the Governor

JOHN C. WEST
GOVERNOR

DIVISION OF ADMINISTRATION
Edgar A. Brown State Office Building
Columbia, South Carolina 29201

July 26, 1974

Mr. G. E. Huey
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

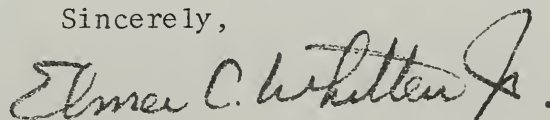
The State Clearinghouse has completed its review of the work plan and draft environmental statement on the Rabon Creek Watershed in Greenville and Laurens County. Enclosed are the comments I have recieved from the State Highway Department, the Department of Archives and History, the State Archeologist, the Department of Health and Environmental Control, and the State Land Resources Conservation Commission.

Please note the comment of the State Highway Department in regards to a request for a meeting to discuss a Primary Connector route which will pass through the watershed area.

Thank you for the opportunity to comment on the documents and your attention to the comments. I would like to receive three copies of the final environmental statement.

If I can be of any further assistance, please let me know.

Sincerely,



Elmer C. Whitten, Jr.
State Clearinghouse

ECWjr/cs
Enclosures

South Carolina

Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

Mr. S. J. Ulmer
Dept. of Health & Environmental Control

STATE APPLICATION
IDENTIFIER

Clearinghouse
Use Only

CONTROL NUMBER

DIST. NO. FY

11 2016 4

SUSPENSE DATE

7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
205 Pendleton Street
Columbia, South Carolina 29201

Signature Elmer C. Whitten, Jr.

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☒ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

This provides an unusual opportunity to utilize soil conservation, flood control, and water supply measures in concert with wastewater treatment measures.

The beneficiary of any one measure tends to benefit from all. Yet, emphasis is on the water primarily as a commodity, and as a destroyer, with only passing acknowledgment of its inherent renewability. The point is that all users are responsible for returning the water to the streams in re-usable form and at least cost to all the users. As usual we are happily providing people and industries with water, but levying no requirement on its treatment after use. After the passage of centuries, we are able to understand that the land must be used over and over again. Applying the same understanding to water is still slow in coming.

W. E. Lineback, Mgr.
Env. Impact Eval. Sect.

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: W. E. Lineback

DATE: July 1, 1974

TITLE: Director, OCHP

PHONE: 758-5537



South Carolina
Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

STATE APPLICATION
IDENTIFIER

Clearinghouse
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CONTROL NUMBER

DIST. NO. FY
11 2016 4

SUSPENSE DATE
7/8

TO: Mr. Charles Lee
Department of Archives & History

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
205 Pendleton Street
Columbia, South Carolina 29201

Signature Elmer C. Whitten, Jr.

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☒ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
☒ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

No National Register properties or other properties of historical importance appear to be affected by this project.

JUL 22 1974

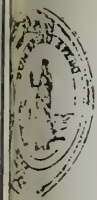
(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: John W. Caloff DATE: June 28, 1974

TITLE: Hist. Preservation Division PHONE: 758-5816





South Carolina Project Notification & Review System

RECEIVED JUN 21 1974 (3)

PROJECT NOTIFICATION REFERRAL

r. Robert Stephenson
Dept. of Archeology & Anthropology
USC
Columbia, S. C. 29201

STATE APPLICATION
IDENTIFIER

Clearinghouse
Use Only

CONTROL NUMBER

DIST.	NO.	FY
11	2016	4

SUSPENSE DATE
7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This system coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
105 Pendleton Street
Columbia, South Carolina 29201

Signature Elmer C. Whitten, Jr.

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☒ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

The Institute of Archeology and Anthropology, University of South Carolina, has record of sites of archeological and historic significance in or immediately adjacent to this project area. Others may also be located within the project area as a thorough search of the ground under consideration has not been made.

The Institute recommends that an archeological survey of the project area be undertaken before construction begins. This survey should be accomplished as soon as possible after plans for the project are firm so that it can be done with ample lead-time to assure that construction will not be delayed.

The South Carolina Department of Archives and History should be consulted as to potential locations of historic buildings in the area.

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: Robert Stephenson

DATE: June 24, 1974

TITLE: Director and State Archeologist

PHONE: 777-8170

South Carolina

Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

STATE APPLICATION
IDENTIFIER

Clearinghouse
Use Only

CONTROL NUMBER

DIST. NO. FY

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SUSPENSE DATE

7/8

To: State Land Resources Conservation Commission

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
205 Pendleton Street
Columbia, South Carolina 29201

Signature _____

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☒ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
☐ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

In reference to page 14 of the Land Plan, permeability rating of "Category-7 area soils" should be moderately rapid instead of moderate.

JUN 24 1974

CLERK
NOTIFICATION

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: H. H. H. H.

DATE: 6-21-74

TITLE: Rep. Rep.

PHONE: 758-2823

South Carolina

Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

Mr. Charles Moorefield
State Highway Department

STATE APPLICATION
IDENTIFIER

Clearinghouse
Use Only

CONTROL NUMBER

DIST.	NO.	FY
11	2016	4

SUSPENSE DATE
7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This system coordinates the review of proposed federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. Comments will be reviewed and compiled by the State Clearinghouse. Any questions should be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
105 Pendleton Street
Columbia, South Carolina 29201

Signature _____

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☒ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☐ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

The S. C. Highway Department is planning a Primary Connector route which will pass through the middle of this area. A meeting should be set to determine if there is a conflict.

Please have the appropriate people contact Location Engineer Yobs South Carolina Highway Department, Columbia, Phone 758-3414.

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY

SIGNATURE: W. L. McIlwain

DATE: July 1, 1974

TITLE: Program Coordinator

PHONE: 758-2366

State of South Carolina
Office of the Governor

JOHN C. WEST
GOVERNOR

DIVISION OF ADMINISTRATION
Edgar A. Brown State Office Building
Columbia, South Carolina 29201


August 20, 1974

Mr. G. E. Huey
State Conservationist
Soil Conservation Service
Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201

Dear Sir:

Enclosed for your information are the additional referrals received by the State Clearinghouse on the Rabon Creek Watershed.

Sincerely,



Elmer C. Whitten, Jr.
State Clearinghouse

ECW/dc

Enclosures: (3)



South Carolina

Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

TO: Department of Agriculture

STATE APPLICATION
IDENTIFIER

Clearinghouse
Use Only

CONTROL NUMBER

DIST.	NO.	FY
11	2016	4

SUSPENSE DATE
7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
1205 Pendleton S
Columbia, South Carolina 29201

Signature _____

Name Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☒ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☐ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

JUL 03 1978

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: Richard M. Mayfield

DATE: July 2, 1978

TITLE: Deputy Commissioner

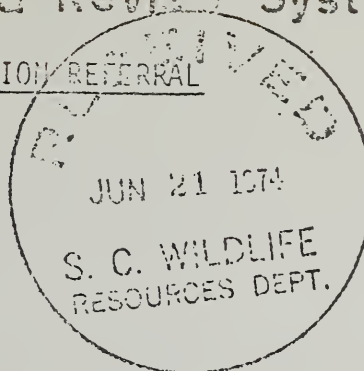
PHONE: 758-2426

South Carolina

Project Notification & Review System

PROJECT NOTIFICATION REFERRAL

To: Mr. James W. Webb
Wildlife & Marine Resources



STATE APPLICATION IDENTIFIER

Clearinghouse Use Only

CONTROL NUMBER

DIST. NO. FY

11 2016 4

SUSPENSE DATE

7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This system coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 758-2944. Please return this form prior to the above suspense date to:

State Clearinghouse
Division of Administration
205 Pendleton Street
Columbia, South Carolina 29201

Signature

Elmer C. Whitten, Jr.

Name

Elmer C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☒ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☐ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

JUL 1 0 1974
OFFICE OF
ADMINISTRATION

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE:

James W. Webb

DATE: July 8, 1974

TITLE:

Executive Director

PHONE: 758-6536

Project Notification & Review System

PROJECT NOTIFICATION REFERRALTO: Joe Wickel
State PlanningSTATE APPLICATION
IDENTIFIERClearinghouse
Use Only

CONTROL NUMBER

DIST. NO. FY
11 2016 4

SUSPENSE DATE

7/8

The attached project notification is being referred to your agency in accordance with Office of Management and Budget Circular A-95. This System coordinates the review of proposed Federal or federally assisted development programs and projects. Please provide comments below, relating the proposed project to the plans, policies, and programs of your agency. All comments will be reviewed and compiled by the State Clearinghouse. Any questions may be directed to this office by phone at 4758-2944. Please return this form prior to the above suspense date.

State Clearinghouse
Division of Administration
1205 Pendleton Street
Columbia, South Carolina 29201

Signature

Name Elder C. Whitten, Jr.

RESULTS OF AGENCY REVIEW

- ☐ PROJECT CONSISTENT WITH AGENCY PLANS AND POLICIES
- ☐ AGENCY REQUESTS CONFERENCE TO DISCUSS COMMENTS
- ☐ AGENCY COMMENTS ON CONTEMPLATED APPLICATION AS FOLLOWS:

(Use separate continuation sheets if necessary)

FOR THE REVIEWING AGENCY:

SIGNATURE: _____

DATE: _____

TITLE: _____

PHONE: _____

Advisory Council
On Historic Preservation

15 - 1000 - 1000
Washington, D.C. 20000

July 5, 1974

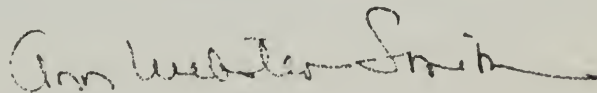
Mr. G.E. Huey
State Conservationist
Soil Conservation Service
United States Department of Agriculture
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

This is in response to your request of June 14, 1974 for comments on the environmental statement for the Rabon Creek Watershed, South Carolina. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that while you have discussed the historical, architectural, and archeological aspects related to the undertaking, the Advisory Council needs additional information to adequately evaluate the effects on these cultural resources. Please furnish additional data indicating evidence of contact with the South Carolina State Historic Preservation Officer and that a copy of his comments concerning the effects of the undertaking upon the resources that have been identified be included in the environmental statement. The State Historic Preservation Officer for South Carolina is Dr. Charles Lee, Director; State Archives Department; 1430 Senate Street; Columbia, South Carolina 29211.

Should you have any questions or require any additional assistance please contact Ernest R. Holz of the Advisory Council staff.

Sincerely yours,



Ann Webster Smith
Director, Office of Compliance

State of South Carolina
Water Resources Commission

Clair P. Guess, Jr.
Executive Director

September 13, 1974

Mr. G. E. Huey, State Conservationist
United States Department of Agriculture
Soil Conservation Service
901 Sumter Street
Columbia, South Carolina 29201

Dear Sir:

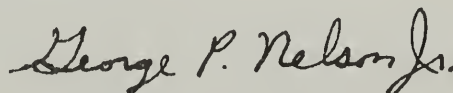
Thank you for your letter of June 14, 1974, in which you transmitted the environmental statement for the Rabon Creek Watershed Project. We have discussed this project on several occasions with Mr. James Keesecker of your office. Mr. Keesecker has been most helpful in answering our questions and as a result of these discussions, the South Carolina Water Resources Commission feels that there will be no undue environmental damage caused by the project.

We would strongly urge that the sediment abatement procedures, as outlined in the environmental statement for the construction phase of the project, be strictly adhered to.

It is our understanding that the final environmental statement will reflect the fact that municipal and industrial water supply is included in the Beaverdam and Warrior Creeks Watershed project, as well as for the Reedy Fork Creek project. It is also our understanding that Item 4 of the section Project Objectives and Purposes will be amended to more clearly show that contact water sports are not planned as part of the recreational facilities for the project.

The South Carolina Water Resources Commission appreciates the opportunity to comment on the draft environmental statement and offers any assistance we might provide.

Sincerely,



George P. Nelson, Jr.
Civil Engineer

GPNJr:ps



UPPER SAVANNAH

REGIONAL PLANNING AND DEVELOPMENT COUNCIL

P. O. BOX 1244, GREENWOOD, S.C. 29646, 803 229-6627

October 8, 1974

Mr. George Huey
State Conservationist
901 Sumter Street
Columbia, South Carolina 29201

Dear Mr. Huey:

The Rabon Creek Watershed Project in Laurens County has been recognized as having significant impact on the future well-being of the citizens of Laurens County and our region.

We urge favorable consideration by your office with the hope that the final implementation is imminent.

It is a pleasure to associate with your office in all endeavors.

Sincerely,

Dan B. Mackey, II
Executive Director

DBM/adr

cc: Board Members, Laurens County
Furman Ott

WS (PL-566)-263
Rabon C

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
901 Sumter Street, Columbia, South Carolina 29201

SUBJECT: WS (PL-566) - Rabon Creek Watershed

DATE: March 28, 1975

TO: D. S. Kirkpatrick, Area Conservationist, SCS, Anderson, S. C.
John S. Case, District Conservationist, SCS, Greenville, S. C.
J. W. Black, Jr., District Conservationist, SCS, Laurens, S. C.

This concerns the plan for the Rabon Creek Watershed as it relates to your assistance to landowners in the watershed.

In providing assistance to landowners it is essential that you recognize the values of bottomland hardwoods. Where such values exist we will not recommend clearing of these lands for other uses. Your recommendations will include measures to favor the tree species and conditions which are desirable for adapted kinds of game and non-game wildlife. Except for brushland, any recommended clearing will need the concurrence of our woodland conservationist and biologist.

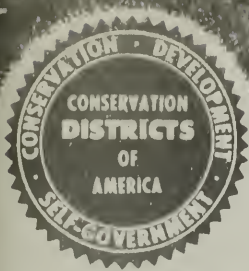
I request you contact the local representatives of the S. C. Wildlife and Marine Resources Department and become familiar with the objectives of their game management system as it relates to the Rabon Creek Watershed. I ask that you assist them in your contacts with landowners in attaining these objectives.

G. E. Huey

G. E. Huey
State Conservationist

cc: James M. Kesecker





Laurens County Soil and Water Conservation District OF SOUTH CAROLINA

P.O. Box 348 · Laurens, South Carolina 29360 · Phone: 984-6921

DISTRICT COMMISSIONERS

March 26, 1975

RYAN F. LAWSON, Chairman
Rt. 3, Clinton, S.C.

M. Y. BLAKELY, Vice-Chairman
207 Forest Dr., Laurens, S.C.

J. W. TINSLEY, Sec.-Treas.
Rt. 3, Laurens, S.C.

HORACE L. MARTIN
Rt. 2, Gray Court, S.C.

JAMES D. WASSON
Rt. 3, Laurens, S.C.

Mr. George E. Huey
State Conservationist
Columbia, South Carolina

Dear Mr. Huey:


This is in response to your recent request regarding our position on (a) agricultural encroachment on high value bottomland hardwood areas of the Rabon Creek Watershed; (b) South Carolina Wildlife Resources Department's game management area system; and (c) establishment of wildlife food and cover plantings on private lands as a part of our district program.

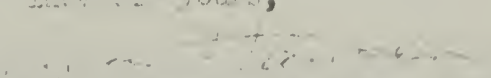
This district has a long appreciation of wildlife habitat values of good bottomland hardwoods in Laurens County. As sponsors of the Rabon Creek Watershed Project, in our conservation planning assistance we will advise and counsel the landowners on the preservation and management of bottomland hardwoods for their monetary and wildlife values. It is our judgment that in the foreseeable future only minor or select clearing of hardwoods will occur in the bottomlands of this watershed.

The South Carolina Wildlife Resources Department advises us that at this time they are not seeking new participants in the game management system unless it involves large tracts or will make the present small tracts contiguous. Since we are in regular contact with landowners we will assist and support these objectives.

We wish to point out that we establish annual goals and objectives for planning and establishing wildlife habitat. You can be assured that under the watershed program the 300 acres of wildlife enhancement measures described in the work plan will be established. As you know, this district has long been active in establishing wildlife conservation measures and will certainly continue to do so.

Sincerely yours,


Furman E. Ott, Chairman
Rabon Creek W/S Conservation
District


Ryan F. Lawson, Chairman Laurens SWCD



South Carolina
State Commission of Forestry

P. O. Box 129, Newberry, S. C.
December 20, 1974

P. O. BOX 297
COLUMBIA, S. C. 292

IN R. TILLER
TE FORESTER

Mr. Norman Shuler
Asst. State Soil Conservationist
901 Sumter Street
Columbia, South Carolina

Dear Mr. Shuler:

Following is information as requested concerning the damage to or loss of mast producing tree species due to the curtailment of irregular flooding caused by the construction of the Rabon Creek Watershed structures.

The major dominate and codominate tree species found throughout the flood plain of Rabon Creek and its major tributaries regardless of changes in alluvial soils are Red Gum (*Liquidambar Styraciflua*), Red Maple (*Acer rubrum*), River Birch (*Betula nigra*), Sycamore (*Platanus occidentalis*), Tulip Poplar (*Liriodendron tulipifera*), Water Oak (*Quercus nigra*), White Ash (*Fraxinus americana*). Of these, Red Gum, River Birch, Sycamore and Tulip Poplar are intolerant of shading and are generally considered pioneer species. White Ash and Water Oak have intermediate tolerance and only Red Maple can tolerate heavy shade. These dominate and codominate trees average 8-12" DBH (Diameter Breast Height) and 40' to 60' in height.

Site requirements of these species according to "Textbook of Dendrology" by William M. Harlan and Ellwood S. Sora are as follows:

5 Water Oak - This tree is a bottomland species although also found on moist uplands.

2⁰ White Ash - White Ash commonly occurs in the south on loamy ridges in the bottoms accompanied by the hickories, etc., or elsewhere on well drained slopes and coves.

December 20, 1974

25 River Birch - It is commonest along stream banks and other moist places.

5 Sycamore - One of the commonest of stream-bank and bottomland species.

10 Tulip Poplar - Is commonly found on moist but well-drained soils of loose texture and of moderate depth.

5 Red Maple - It is characteristic of swampy sites and is often found in drier locations.

25 Red Gum - Typical southern bottomland species and occurs for the most part on rich, moist, alluvial soils, with the exception of unusually poorly drained clay flats and of swamps.

Water Oak and Red Gum are the only two of these species that produce enough seed for various wildlife species to be considered as mast producers. Site changes caused by flood retarding structures would have no effect on these as well as the other tree species. The elimination of the irregular washing out of this flood plain would tend to increase numbers of understory and herbaceous plant species which would add to available wildlife food and cover. Better drainage should also increase the numbers of oaks and hickories in the intermediate stage of plant succession in these bottoms after the pioneer species die out.

Hope this information will be of use to you and the Rabon Creek Watershed Directors.

Very truly yours,

Dale L. Mayson

Dale L. Mayson
Forester

C. Crosby Rice

C. Crosby Rice
RC&D Forester





LEGEND

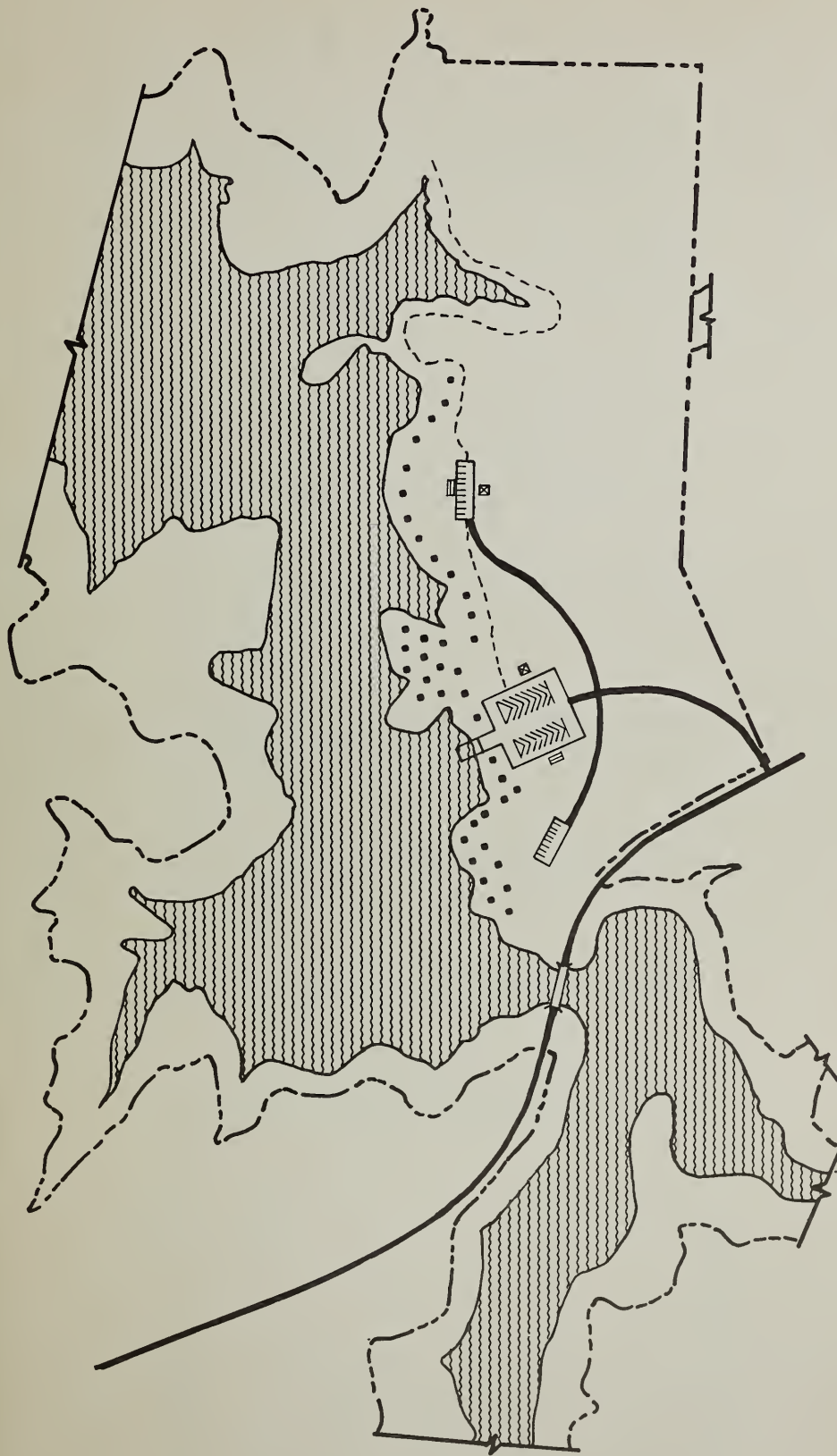
- PAVED ROAD
- FOOT TRAIL
- PARING AREA
- PICNIC TABLE
- PICNIC SHELTER
- COMFORT STATION
- BOAT RAMP
- PURCHASE BOUNDARY

NORTH RABON CREEK RECREATIONAL AREA RABON CREEK WATERSHED

STRUCTURE 32
LAURENS COUNTY SOUTH CAROLINA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLUMBIA, SOUTH CAROLINA

N

200 0 200
SCALE IN FEET



- LEGEND
- PAVED ROAD
 - FOOT TRAIL
 - PARKING AREA
 - PICNIC TABLE
 - PICNIC SHELTER
 - COMFORT STATION
 - BOAT RAMP
 - PURCHASE BOUNDARY

N

200 0 200
SCALE IN FEET

SOUTH RABON CREEK
RECREATIONAL AREA
RABON CREEK WATERSHED

STRUCTURE 32
LAURENS COUNTY SOUTH CAROLINA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
COLUMBIA, SOUTH CAROLINA

APPENDIX G - WATER WELLS IN RABON CREEK WATERSHED,
MAXIMUM CONSUMPTION FROM WELLS AND THEIR CHEMICAL ANALYSES 1/

Well Location and Number	Maximum Consumption MGD	Test Date	Solids 2/	Alkalinity	Calcium	Magnesium	Hardness	Iron	Chlorides	Acidity	Copper	Zinc
Gray Court 130003	.138 (5 wells)	12-71	96	19	5.6	1.5	20		12	6.2	.5	
		06-72	86	35	4.8	1.4	18		8	6.8	.6	.6
		01-73	66	39	3.8	1.2	15	.1		7.4	.2	.5
		07-73	76	22	2.8	.9	11		2	6.8	.4	1.2
Hickory Tavern 530002	.017	12-71	58	27	3.1	.9	12		1	7.2	.4	.4
		06-72	78	28	2.7	.8	10		2	7.2		7.0
		12-72	54	30	3.6	1.1	14		3	7.1	.3	
		06-73	54	24	3.2	1.3	13		3	7.2		.3
Colonial Acres 530003	.020	12-71	28	8	.9	.5	4		3	6.5	.5	.4
		06-72	44	8	1.0	.6	5		4	6.1	.1	2.4
		12-72	36	12	1.0	.7	5		4	6.3	1.7	.1
		06-73	24	2	1.1	.9	6		4	6.1	1.1	.1
Hickory Heights 530004	.012 (2 wells)	12-71	76	32	2.3	.9	10		1	6.9		2.5
		06-72	82	31	1.7	.9	8		2	6.6		8.2
		12-72	66	26	2.4	.8	9	.1	8	7.0	.1	1.3
		06-73	82	22	2.0	.9	9		3	7.1		.3
Dillard, T.P. No. 1 630005	.014 (2 wells)	12-71	62	37	3.8	1.4	15		1	6.7		.1
		06-72	94	37	3.2	1.2	13		3	6.5		1.2
		12-72	92	38	3.7	1.3	15		4	6.5		
		06-73	78	34	3.5	1.6	15		5	6.9	.3	.5
Dillard, T.P. No. 2 630009	.014 (2 wells)	06-72	54	32	2.5	1.6	13		2	6.6		3.9
		12-72	84	36	2.7	1.7	14	.1	6	6.6	3.3	1.0
		06-73	96	32	2.4	1.7	13		5	7.1		.2

1/ South Carolina Department of Health and Environmental Control, 1974 Report.

2/ All measured in parts per million.

April 1974

APPENDIX H - CHARACTERISTICS OF STREAMS IN RABON CREEK WATERSHED

Stream and Area Described	Bottom Width (ft.)	Bank Side Slope	Channel Depth (ft.)	Debris in Channel	Bank Vegetation	Channel Bottom Material	Adjacent Bank Land Use	Amount of Sediment Present	Channel Bank Stability	Channel Alignment
South Rabon Creek, ½ mile below junction of Payne Branch	14	1:1	6	Slight	Trees, vines	Sand	Forest	Slight	Stable	Slight bends
South Rabon Creek, 2 miles SE of Rabon Creek Church	25	1:1	6.5	Slight	Trees, vines	Sand	East bank, cultivated West bank, forest	Heavy	Mostly stable	Gradual bends
South Rabon Creek, 2 miles N of junction with North Rabon Creek	39	1:1	7	Moderate	Few trees	Sand	Pasture	Heavy	Stable	Gradual bends
North Rabon Creek, ¼ mile N of junction with State Highway 101	21	3/4:1	8	Slight	Trees, brush	Sand	East bank, pasture West bank, forest	Slight	Stable	Slight bends
North Rabon Creek, 1 mile S of State Highway 101	21	1:1	8	Moderate	Trees, brush	Sand & rock shoals	Forest	Slight	Stable	Slight bends
Mountain Creek, at junction with North Rabon Creek	18	1:1	9	Slight	Trees, brush	Sand	Pasture, forest	Moderate	Stable	Slight bends
Rabon Creek, 1 mile S of State Highway 252	42	1:1	4	Heavy logs, brush	Trees, brush	Sand	Forest	Heavy	Stable	Sharp bends
Dirty Creek, at junction with Rabon Creek	20	1:1	4	Moderate	Trees, brush	Sand	Forest	Slight	Stable	Slight bends
Rabon Creek, from Dirty Creek to 3 miles N of Lake Greenwood	40-50	1:1	4-6	Heavy logs, brush	Trees, brush	Sand	Forest, pasture	Heavy	Stable	Moderate bends
Rabon Creek, from 3 miles N of Lake Greenwood to backwaters of lake	40-50	1:1	3-5	Heavy logs, brush	Trees, brush	Sand	Forest, pasture	Heavy	Stable	Moderate bends

APPENDIX I - SURFACE WATER QUALITY IN RABON CREEK WATERSHED 1/

Station Number and Location	Date of Sample	Water Temperature (centigrade)	pH	Dissolved Oxygen (MG/L)	Fecal Coliform (No./100ML)	Biochemical	
						Oxygen Demand	5 Day (MG/L)
S-244	71/ 4/29	13.0	6.5	8.1	-		0.8
Bridge over South	71/ 5/11	14.0	6.8	9.4	-		0.8
Rabon Creek at	71/ 5/17	15.0	6.1	8.1	790		0.6
county line	72/ 2/28	9.0	6.6	11.5	20		0.4
	72/ 2/29	10.0	6.4	12.0	160		0.5
	72/ 3/ 1	10.5	6.7	11.2	162		0.9
	72/ 3/ 2	13.5	6.7	10.3	640		0.3
	72/ 6/ 8	18.0	6.3	9.2	1,280		0.8
	72/ 7/27	19.5	6.5	7.9	-		-
	72/ 9/ 5	18.0	6.8	8.2	1,500		-
	73/ 4/ 5	15.0	6.3	9.7	-		2.0
	73/ 5/31	17.0	6.6	8.9	200		5.0
	73/ 6/12	20.0	6.7	9.9	190		1.3
	73/ 7/ 2	21.0	6.6	8.2	2,080		1.8
	73/ 7/23	20.0	7.2	8.4	-		-
	73/ 7/25	21.0	-	8.2	-		-
	73/ 8/20	20.0	6.8	8.0	900		3.3
	73/ 9/19	18.0	6.5	8.0	500		2.7
	73/10/22	14.0	6.5	9.7	2,600		3.1

APPENDIX I - SURFACE WATER QUALITY IN RABON CREEK WATERSHED 1/

Station Number and Location	Date of Sample	Water Temperature (centigrade)	pH	Dissolved Oxygen (MG/L)	Fecal Coliform (No./100ML)	Biochemical
						Oxygen Demand 5 Day (MG/L)
S-247 Bridge over South Rabon Creek on U.S. Highway 76	71/ 5/18	15.0	6.3	9.7	1,100	0.5
	71/ 5/19	16.0	6.4	8.6	1,100	0.2
	71/ 5/26	15.0	6.7	9.1	170	0.8
	72/ 6/ 8	16.5	6.5	9.8	300	0.7
	72/ 8/31	20.0	7.1	8.7	100	-
	72/ 9/ 5	19.5	6.8	8.2	70	0.5
	72/ 9/12	19.5	7.0	8.7	40	-
	72/10/16	13.5	7.1	10.0	140	-
	72/11/13	14.0	7.2	7.1	94	-
	73/ 4/ 5	15.5	6.3	9.2	100	2.2
	73/ 5/31	17.0	6.6	9.2	80	3.5
	73/ 7/ 2	22.0	6.7	8.3	350	2.0
	73/ 7/25	21.0	-	7.6	-	-
	73/ 8/20	20.0	6.8	8.3	700	1.5
	73/ 9/20	18.0	6.7	8.9	700	1.2
	73/10/22	14.0	6.8	9.6	360	1.8
S-095 Bridge over North Rabon Creek on U.S. Highway 76	62/ 8/20	22.8	7.0	8.1	-	0.9
	62/ 8/23	22.0	7.8	7.9	-	-
	63/ 6/12	20.0	6.9	8.8	-	1.1
	63/ 6/13	19.5	6.9	8.4	-	1.8
	63/ 6/14	20.5	6.9	8.3	-	1.0
	68/10/ 4	17.0	6.6	4.3	-	1.9
	68/10/ 7	15.0	6.9	9.1	-	1.2

APPENDIX I - SURFACE WATER QUALITY IN RABON CREEK WATERSHED 1/

Station Number and Location	Date of Sample	Water Temperature (centigrade)	pH	Dissolved Oxygen (MG/L)	Fecal Coliform (No./100ML)	Biochemical	
						Oxygen Demand	5 Day (MG/L)
S-095 (continued)	70/ 7/15	22.5	6.2	7.4	-		2.8
	70/ 7/16	23.0	6.5	9.4	-		1.2
	70/ 7/17	21.0	6.3	7.8	-		1.0
	73/ 4/ 5	16.0	6.6	9.1	80		2.1
	73/ 5/31	19.0	6.7	8.7	160		4.8
	73/ 7/ 2	21.0	6.8	7.9	810		1.4
	73/ 7/25	21.0	-	7.5	-		-
	73/ 8/20	20.0	6.6	7.2	1,350		1.9
	73/ 9/20	19.0	6.6	8.1	850		1.3
	73/10/22	14.0	6.8	9.3	160		1.6
	71/ 5/18	16.0	6.3	8.9	490		0.6
	71/ 5/19	16.5	6.6	8.5	490		0.4
	71/ 5/26	16.0	6.8	9.0	170		0.4
S-248 Bridge over Rabon Creek at State Highway 252	72/ 5/ 9	17.5	6.1	7.4	1,540		2.4
	72/ 6/ 8	17.0	6.5	9.5	300		0.6
	72/ 9/ 5	19.0	7.2	8.3	180		0.2
	73/ 4/ 6	14.0	6.5	10.2	60		2.2
	73/ 6/ 1	18.0	6.7	8.7	250		1.9
	73/ 7/ 3	22.0	7.0	8.0	650		2.2
	73/ 8/21	20.0	7.1	8.3	406		0.7
	73/ 8/29	21.0	7.1	6.6	-		-
	73/ 9/18	21.0	6.8	8.0	600		2.7

APPENDIX I - SURFACE WATER QUALITY IN RABON CREEK WATERSHED 1/

Station Number and Location	Date of Sample	Water Temperature (centigrade)	pH	Dissolved Oxygen (MG/L)	Fecal Coliform (No./100ML)	Biochemical	
						Oxygen Demand	5 Day (MG/L)
S-096	62/ 8/20	23.0	6.9	8.0	-		0.4
Bridge over Rabon	62/ 8/23	23.0	6.5	7.1	-		-
Creek at State	63/ 6/12	22.0	7.1	7.7	-		1.3
Highway 54	63/ 6/13	21.5	7.0	7.6	-		2.4
	63/ 6/14	22.0	7.0	7.7	-		1.1
	68/10/ 4	18.0	6.8	8.5	-		0.4
	68/10/ 7	15.0	7.1	8.9	-		1.3
	68/11/13	-	6.3	-	7,900		7.5
	68/11/14	-	6.4	-	2,300		2.6
	68/11/15	-	6.2	-	490		1.9
	68/11/18	-	5.9	-	2,300		5.0
	68/11/19	-	6.2	-	35,000		4.0
	68/11/20	-	5.8	-	7,000		1.1
	68/11/21	-	5.4	-	2,300		1.2
	69/ 3/19	12.0	5.8	11.6	1,100		2.6
	69/ 3/20	13.0	5.7	12.3	1,700		1.1
	69/ 3/21	12.0	6.4	10.5	170		1.3
	69/ 3/22	11.5	6.3	11.3	2,300		1.5
	69/ 3/23	12.0	6.4	12.8	700		1.8
	69/ 3/24	14.0	6.9	11.4	2,200		3.5

APPENDIX I - SURFACE WATER QUALITY IN RABON CREEK WATERSHED 1/

Station Number and Location	Date of Sample	Water Temperature (centigrade)	pH	Dissolved Oxygen (MG/L)	Fecal Coliform (No./100ML)	Biochemical
						Oxygen Demand 5 Day (MG/L)
S-096 (continued)	69/ 3/25	13.0	6.0	9.8	4,900	0.5
	69/ 3/26	11.0	6.6	10.1	330	1.3
	69/ 7/15	25.0	6.9	7.2	270	0.7
	69/ 7/16	23.0	7.2	7.4	1,300	2.8
	69/ 7/17	23.5	7.5	6.5	490	2.4
	69/ 7/18	24.0	7.3	7.3	790	1.9
	69/ 7/19	25.0	6.8	7.6	490	1.6
	69/ 7/20	26.0	6.5	6.9	490	1.9
	69/ 7/21	24.0	6.9	7.3	490	1.2
	69/ 7/22	25.0	6.8	7.2	460	2.2
	71/ 5/18	17.0	6.4	8.8	490	0.9
	71/ 5/19	17.0	6.5	8.1	330	1.5
	71/ 5/26	17.0	6.7	9.1	230	0.4
	73/ 4/ 6	14.0	6.5	9.4	40	1.8
	73/ 6/ 5	20.0	6.8	9.3	260	2.2
	73/ 7/ 3	24.0	7.0	8.2	510	3.2
	73/ 7/30	24.0	-	8.1	-	-
	73/ 8/21	21.0	7.3	8.0	263	0.3
	73/ 9/18	21.0	6.4	7.6	625	2.0
	73/10/23	13.0	6.9	9.7	231	0.9

1/ Computer Data, Surface Water Quality Samples, South Carolina Department of Health and Environmental Control, 1973.

APPENDIX J - QUALITY STANDARDS FOR CLASS "B" WATERS 1/

Class "B" waters are suitable for domestic supply after complete treatment in accordance with requirements of the South Carolina Department of Health and Environmental Control. They are also suitable for propagation of fish, industrial and agricultural uses and other uses requiring water of lesser quality.

Items	Specifications
1. Fecal coliform	Not to exceed a geometric mean of 1000/100 ml based on five consecutive samples during any 30 day period; nor to exceed 2000/100 ml in more than 20 percent of the samples examined during such period (not applicable during or following periods of rainfall).
2. pH	Range between 6.0 and 8.5, except that swamp waters may range from pH 5.0 to pH 8.5.
3. Dissolved oxygen	Daily average not less than 5 mg/l, with a low of 4 mg/l, except that swamp waters may have an average of 4 mg/l.
4. Phenolic compounds	Not greater than 1 microgram per liter unless caused by natural conditions.
1/ Water Classification Standards System for the State of South Carolina, South Carolina Pollution Control Authority, 1972.	

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APPENDIX K - SOUTH CAROLINA DRINKING WATER STANDARDS 1/

The South Carolina Department of Health and Environmental Control collects samples of water from the distribution systems of public water supplies in South Carolina, and conducts chemical analyses in accordance with the Law, Rules and Regulations for Waterworks Systems in the State of South Carolina. These analyses are designed to determine if the finished water meets standards for chemical quality as set forth in the 1962 U.S. Public Health Service Drinking Water Standards. These analyses are also used to evaluate treatment processes where such processes are employed.

Characteristic or Chemical Substance	Limit
Total Solids	Should not exceed 500 mg/l
Turbidity	Should not exceed 5 t.u.
Color	Should not exceed 15 units
Alkalinity	Should not exceed 500 mg/l
Calcium	Related to hardness
Magnesium	Related to hardness
Hardness	Should not exceed 100 mg/l
Sodium	No standard. Provided as information for medical doctors when requested
Iron	Should not exceed 0.3 mg/l
Chloride	Should not exceed 250 mg/l
pH	Acceptable range from 6.5 to 8.5
Manganese	Should not exceed 0.05 mg/l
Copper	Should not exceed 1.0 mg/l
Zinc	Should not exceed 5.0 mg/l
Potassium	No standard. Provided as information for medical doctors when requested
Mercury	Should not exceed 0.5 ppb
Chromium	Should not exceed 0.05 mg/l
Cadmium	Should not exceed 0.01 mg/l
Lead	Should not exceed 0.05 mg/l

1/ Law, Rules and Regulations for Waterworks Systems in the State of South Carolina, South Carolina State Board of Health, November 1970.



